

University of West Georgia

Course Syllabus Foundation of Numbers and Operations (MATH2008) Spring 2016

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Conference Hours:
Tuesday 8:00 – 11:00, 2:00 – 3:00
By Appointment
Thursday 8:00 – 11:00, 2:00 – 3:00
By Appointment

Text:

1. Billstein, R., Libeskind, S., and Lott, J., (2013), A problem Solving Approach to Mathematics for Elementary School Teachers, Eleven Edition, Pearson Addison-Wesley, Boston, MA. ISBN: 0-321-33179-6.

STUDENT LEARNING OUTCOMES

After completion of the course, the student will --

Sequences & mathematical reasoning

- Identify patterns, predict next term, find and apply formulas for arithmetic, geometric, Fibonacci, "see-and-say", exponential (n^x), and power sequences (2^n)
- Model sequences concretely, symbolically and abstractly
- Develop and use iteration and recursion to model and solve problems
- Investigate interesting subsets of the natural numbers (evens, odds, powers of two, Fibonacci numbers, perfect squares)

Number systems

- Compare and contrast number systems (additive, subtractive, character, place value)
- Identify the structure and chart the relationships in the real number system
- Describe the roles of zero, face and place value in the base ten system
- Model whole numbers using Base 10 blocks
- Analyze, explain and model binary operations on whole numbers using Base 10 blocks
- Recognize and analyze standard and non-standard algorithms for binary operations on whole numbers
- Analyze error patterns of students working standard algorithms for binary operations on whole numbers
- Recognize and apply properties of real numbers

Prime & composite numbers

- Explain two or more reasons why one is not a prime number
- Develop full definitions of prime and composite numbers
- Identify prime numbers between 1-100 and how to find prime numbers greater than 100
- List all factors of a given number
- Determine the prime factorization of any given whole number
- Find GCF/LCM for a given set of whole numbers

Integers

- Model integers using 2-color chips
- Analyze, explain and model binary operations on integers using 2-color chips
- Explore historical/cultural scenarios using powers of two
- Explore powers of ten

Rational numbers

- Model fractions using Pattern blocks, Fraction bars and Fraction grids (area models)
- Model binary operations on fractions using Pattern blocks, Fraction bars and Fraction grids (area models)
- Explain and justify traditional algorithms for binary operations on fractions
- Create equivalent fractions using paper and manipulative
- Explain why rational numbers are dense on the real numbers; give an example of a number set that is not dense and explain why not
- Put a set of fractions in order from smallest to greatest
- Find at least two fractions between a given pair of fractions

In the context of the above expectations, a student will --

Mathematical processes

- Make conjectures and use deductive methods to evaluate the validity of conjectures
- Recognize that a mathematical problem can be solved in a variety of ways, evaluate the appropriateness of various strategies, and select an appropriate strategy for a given problem
- Evaluate the reasonableness of a solution to a given problem
- Use physical and numerical models to represent a given problem or mathematical procedure
- Recognize that assumptions are made when solving problems and identify and evaluate those assumptions
- Explore problems using verbal, graphical, numerical, physical, and algebraic representations

Mathematical Perspectives

- Appreciate the contributions that different cultures have made to the field of mathematics and the impact mathematics has on society and culture
- Understand and apply how mathematics progresses from concrete to representation to abstract generalizations

Communication

- Communicate mathematical ideas and concepts in age-appropriate oral, written and visual forms for a class presentation

- Use mathematical processes to reason mathematically, solve mathematical problems, make mathematical connections within and outside of mathematics, and communicate mathematically
- Reflect on personal learning, change of attitude and beliefs, and growth in understanding through mathematical journaling
- Translate mathematical statements among developmentally appropriate language, standard English, mathematical language, and symbolic mathematics

Technology

- Use appropriate technology such as calculators, computer software, and the Internet to explore, research, solve, and compare mathematical situations and problems

Professional Development

- Be familiar with the National Council of Teachers of Mathematics and the Principles and Standards for School Mathematics, the NCTM website, and NCTM journals

Course Schedule:

Week 1	Introduction, Exploration with Patterns, Algebraic Thinking
Week 2	An Introduction to Logic, Problem Solving
Week 3	Sets, Set Operation
Week 4	Addition, Subtraction, Multiplication, and Division of Whole Numbers, Problem Solving
Week 5	Numeration Systems, First Exam
Week 6	Algorithms for Whole-Number Addition and Subtraction, Algorithms for Whole-Number Multiplication and Division
Week 7	Mental Mathematics
Week 8	Estimation, Problem Solving
Week 9	Integers and the Operation of Addition and Subtracting, Integers and the Operation of Multiplication and Division
Week 10	Problem Solving, Second Exam
Week 11	The Set of Rational Numbers, Addition and Subtraction of rational Numbers, Multiplication and Division of Rational Numbers, Problem Solving
Week 12	Introduction to Decimals, Operation with Decimals
Week 13	Non-Terminating Decimal
Week 14	Percent
Week 15	Computing Interest, Real Numbers, Problem Solving
Week 16	Course Review, Final Exam

INSTRUCTIONAL METHODS AND ACTIVITIES

Class lectures will include the following: presentation of material and concepts, problem solving techniques, manipulative, computer software, and class discussions. Quizzes will be given throughout the semester.

Note: There is no make up for daily quizzes under any circumstances. There is no make up for the tests unless the student presents a legitimate excuse. Calculators are not allowed to be used for quizzes or tests.

Evaluation and grade Assignment:

Quizzes	100 points
Test 1	100 points
Test 2	100 points
Final Exam (cumulative)	100 points

Final grade will be determined by point accumulation as follows:

A	90% - 100%
B	80% - 89.99%
C	70% - 79.99%
D	60% - 69.99%
F	0%- 59.99%

Class Rules: You are not allowed to be late for the class more than 5 minutes; you may not leave the class early. You are to turn off your cellular phone during the class. You are not to send text. You are not to bring food or drink to the class.

Attendance: Attendance is mandatory. There are only a total of 4 unexcused or excused absences allowed per semester. If you exceed 4 absences you will **fail** the course. Attendance will be checked each class period and it is your responsibility to sign the attendance sheet.

Conferences: Conferences can be beneficial and are encouraged. All conferences should occur during the instructor's office hours, whenever possible. If these hours conflict with a student's schedule, then appointments should be made. The instructor is very concerned about the student's achievement and well-being and encourages anyone having difficulties with the course to come by the office for extra help.

Note: If you have a documented disability, which will make it difficult for you to carry out the course work as I have outlined and / or if you need special accommodation or assistance due to disability, please contact me as soon as possible.