

## MATH 204 — Mathematical Concepts and Structures I Course Content Outline

Current Textbook: Billstein, Libeskind, Lott. *A Problem Solving Approach to Mathematics for Elementary School Teachers*, 12<sup>th</sup> edition. Boston: Pearson Education, Inc., 2016. Custom edition available.

**NOTE: Problem solving, real life applications and mathematical connections should be infused throughout the course.**

A. Problem solving (section 1-1) *2 hour*

- Polya's problem solving model
- Strategies
- Natural/Counting numbers (definition)

B. Numeration systems (section 3-1) *4 hours*

- The Hindu-Arabic system
- Other number base systems (any bases from 2-12)
- Whole numbers (definition, meanings of zero)

C. Whole number operations (sections 3-2 & 3-3) *8 hours*

- Addition (meanings, models, vocabulary, properties, CCSS problem types)
- Subtraction (meanings, models, vocabulary, CCSS problem types)
- Multiplication (meanings, models, vocabulary, properties, CCSS problem types)
- Division (meanings, models, vocabulary, CCSS problem types)
- Operations with zero
- Order of operations
- Exponents

D. Computation of whole numbers (sections 3-4 & 3-5) *7 hours*

- Estimation
- Mental computation
- Written computational strategies (standard and non-standard algorithms)

E. Number theory (chapter 4) *8 hours*

- Multiples/factors
- Divisibility theorems
- Primes/composites, odds/evens, relatively prime
- Fundamental Theorem of Arithmetic, prime factorization
- Divisibility tests (2, 3, 4, 5, 6, 8, 9, 10)
- Greatest common factor
- Least common multiple

F. Integers (section 5-1) *5 hours*

- Concepts (meanings, models, connections to set of whole numbers)
- Operations (addition and subtraction: use models and meanings to make sense of rules, properties)
- Comparing
- Absolute value

G. Fractions that are rational numbers (sections 6-1 thru 6-3) *10 hours*

- Concepts (vocabulary, definition/meanings, models)
- Operations and properties (use models and meanings to make sense of algorithms)
- Comparing (mentally and written)
- Estimation and mental mathematics
- Exponents

H. Decimals (chapter 7) *8 hours*

- Concepts (vocabulary, definition/meaning, models, relationship to fractions and to place value)
- Operations (use models and meanings to make sense of algorithms)
- Estimation and mental mathematics
- Percents (meanings)

NOTE: Other topics may be included if time permits.

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