MATH 105 OUTLINE

MATHEMATICAL CONCEPTS FOR ELEMENTARY TEACHERS

TEXT: Reconceptualizing Mathematics for Elementary School Teachers, 3rd edition by Sowder, Sowder, and Nickerson

*Approved: Effective: Fall 2023*

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| **MATERIAL TO BE COVERED** | **SECTIONS FROM TEXT** | **TIME LINE** |
| Numeration Systems: Ways of expressing values of quantities, place value, bases other than ten, operations in different bases, understanding place value | 2.1 – 2.6 | 8 hours |
| Understanding Whole Number Operations: Ways of thinking about addition and subtraction, children’s ways of adding and subtracting, ways of thinking about multiplication, ways of thinking about division, children find products and quotients, developing number sense | 3.1 – 3.7 | 8 hours |
| Some Conventional Ways of Computing: Operating on whole numbers and decimal numbers, the role of algorithms | 4.1 – 4.3 | 5 hours |
| Using Numbers in Sensible Ways: Mental computation, computational estimation, estimating values of quantities, using scientific notation for estimating values of very large and very small quantities, mental computation | 5.1 – 5.6 | 8 hours |
| Meanings for Fractions: Understanding the meanings of a/b, comparing fractions, equivalent (equal) fractions, relating fractions, decimals, and percents, understanding fractions and decimals | 6.1 – 6.6 | 8 hours |
| Computing with Fractions: Adding and subtracting fractions, multiplying by a fraction, dividing by a fraction, teaching calculation with fractions | 7.1 – 7.5 | 8 hours |
| Integers and Other Number Systems: Big ideas about signed numbers, children’s ways of reasoning about signed numbers, other models for signed numbers, operations with signed numbers, multiplying and dividing signed numbers, number systems, open number sentences | 10.1 – 10.8 | 10 hours |
| Number Theory: Factors and multiples, primes, and composites, prime factorization, divisibility tests to determine whether a number is prime, greatest common factor, least common multiple, understanding the unique factorization theorem | 11.1 – 11.5 | 8 hours |
| Optional: Multiplicative Comparisons and Multiplicative Reasoning: Quantitative analysis of multiplicative situations, fractions in multiplicative comparisons, standards for learning | 8.1 – 8.4 | 5 hours |
| Optional: Ratios, Rates, proportions, and Percents: Ration as a measure, comparing ratios, percents in comparisons and changes, developing proportional reasoning | 9.1 – 9.5 | 5 hours |

4-unit class: hours total 62.5 (15 x 4 hours 10 minutes) – 4 hours for exams + 2.5 hour final [This outline allows for 4 hours of exams.]

**NOTES**: Including a project or presentation assignment is encouraged.

Submitted by: Basilio, DeWilde, Hall, Lancaster, Lee, Ma, Nguyen, Wohlgezogen, Wakefield, and Young

 Math Department Policy can be found at: https://mtsac.instructure.com/courses/33990/files?preview=8920380