

Departmental Syllabus
Math 2030 – Mathematics for Educators II

Textbooks:

Mathematics for Elementary School Teachers, 2nd Edition by P. O’Daffer, R. Charles, T. Cooney, J. Dossey, J. Schielack. Addison-Wesley, 2002.

Teaching and Learning Elementary and Middle School Mathematics, 5th Edition by L. J. Sheffield and D. E. Cruikshank. Wiley, 2005.

Prerequisites: MATH 1030 with a grade of “C” or better.

Course Description: Math 2030 is the second semester in a three-semester sequence of integrated content and methods courses for preservice teachers. It is open only to students in elementary education pursuing certification levels B – 11 or 10 – 14. (The course is not intended for students pursuing certification level 10 – 21.) Topics covered include number theory; composition and decomposition of numbers including primes, factors, and multiples; using physical models to develop concepts of and operations on rational numbers; proportional reasoning; number sense; and selected topics from statistics. Throughout the course, students will be expected to explain their reasoning using appropriate vocabulary and notation.

Test-out Policy: Math 2030 is an integrated content and methods course for preservice teachers. Much of the content material will be embedded in in-class activities that model a variety of teaching methods. As a result, students will be actively involved in doing mathematics during the class period. Because of the significant amount of in-class participation, a student will not be allowed to test out of this course.

Topics to be covered:

Number Theory – Problem solving is a large component of this course as well as Math 3030. As such, we begin this course with problems solving involving number theory. This study of number theory will help develop a foundation for later work with operation on rational numbers. Students will be expected to explain their reasoning using appropriate vocabulary and notation.

- Divisibility
- Prime Numbers
- Composite Numbers
- Prime Factorization
- Greatest Common Divisor
- Least Common Multiple

Rational Number Concepts – In order to better understand the teaching and learning of rational numbers, we will study some of the fundamental ways in which students encounter rational numbers. We will also develop some ways to physically model rational numbers. Students will be expected to explain their reasoning using appropriate vocabulary and notation.

- Part-Whole Concept

- Ratio Concept
- Rate Concept
- Measurement Concept
- Modeling Rational Numbers
 - Area Models (using Fraction Circles, Fraction Factories, Pattern Blocks)
 - Linear Models (using Fraction Strips)
 - Discrete Models

Modeling Rational Number Operations – After developing some models for thinking about rational numbers we develop ways to model operations on rational numbers. Students will be expected to explain their reasoning using appropriate vocabulary and notation.

- Operations on Fractions
- Operations on Decimal Fractions

Modeling Rational Number Operations – After developing some ways to model operations on rational numbers, we study in depths some specific contexts where students encounter rational numbers. Students will be expected to explain their reasoning using appropriate vocabulary and notation.

- Proportional Reasoning Strategies (Build-Up Add-On Equivalent-Fractions, Factor-of-Change, Unit-Rate)
- Solving Percent Problems
- Converting between Representations of Rational Numbers (Fraction Form \Leftrightarrow Decimal Form \Leftrightarrow Percent Form \Leftrightarrow Ratio Form)
- Linear Equations