

Departmental Syllabus

Math 3040 – Mathematics Seminar for Middle School Teachers

Textbooks: *Algebraic Thinking, Grades K-12: Reading from NCTM's School-Based Journals and Other Publications*, edited by Barbara Moses. NCTM, 1999.

Putting It Together: Middle School Math in Transition by G. Tsuruda. Heinemann, 1994.

Students will also be assigned frequent readings from journals and educational reports.

Prerequisites: MATH 3030 with a grade of “C” or better.

Calculators: A graphing calculator is recommended, specifically a TI-83, 84, 85, or 86.

Course Description: This course is intended to provide a background for teaching algebra and geometry in the middle school. The course will focus on problem solving. Through problem-solving activities, the course will emphasize topics such as proportional reasoning, pattern finding, generalizing functional relationships, solving equations, area, perimeter, and volume. In particular, the course will emphasize the links between algebra and geometry. The course will also emphasize current research regarding the teaching and learning of algebra and geometry. Students will be exposed to calculators and computer software relevant to the teaching of algebra and geometry. Such software will include spreadsheets and interactive geometry programs. Students will be introduced to judicious use of relevant manipulatives. Students will be expected to develop and present activities related to algebra and geometry.

Test-out Policy: Math 3040 is an integrated content and methods course. 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.

Major Components of the Course:

Content:

- Historical development of algebra in the middle school
- Evolution of algebraic thinking in elementary and middle school
- Geometry in the middle school
- Making connections in the middle school mathematics curriculum
- Curriculum issues related to teaching mathematics in the middle school

In-Class Presentations by Instructor:

- Presentations will emphasize problem-solving, communication, reasoning, representations, and making connections. In particular, the in-class activities and discussions will emphasize the links between such content areas as algebra, geometry, probability or statistics.
- Some presentations will have a technology focus. Specifically, these presentations will highlight the use of spreadsheets or dynamic geometry packages in the middle school.

In-Class Presentations by Students:

- Students will lead the class in at least two 45-minute instructional activities modeling a class period in a middle school mathematics class. In addition to the lesson, the student will prepare appropriate assessment materials. The focus of the activities will be algebra, geometry, probability or statistics.
- Students will lead at least two 20-minute discussions/presentations as identified by the instructor. The discussions will relate to relevant readings on the teaching and learning of algebra and geometry. The presentations will be based on lessons from a current middle school mathematics textbook or articles from a mathematics education journal.

Weekly Activities:

- On a regular basis, students will be given a “Problem of the Week.” In addition to showing their solution, students will be asked to write-up an explanation of their method of solution. Students will also be asked to generate their own Problems of the Week.
- There will be weekly discussions of readings assigned by the instructor. These will generally focus on curriculum issues or teaching issues related to mathematics in the middle school.