

## Mathematics 67-110 (3 credits) Number Systems

**Pre-requisite:** A minimum grade of C in 67-103 (or equivalent) or placement in a higher numbered course is required.

**Course Objectives:** This course is designed to give you an **experience** in thinking mathematically. This means that you will solve problems, make conjectures, make arguments, evaluate the claims of others and communicate your findings and ideas. The content of the course includes important ideas from the elementary school curriculum. This class is designed to 1) help you to understand the structure that underlies our familiar number systems, operations, and algorithms; 2) help you to understand children's thinking in arithmetic; 3) make you an experienced problem-solver; 4) provide you practice listening to the mathematical ideas of others and explaining your own mathematical thinking both orally and in writing; and 5) give you a profound appreciation for mathematics.

**Instructor:** Dr. Jennifer Szydlik

**Office:** 218 Swart; **Phone:** 424-7350; **email:** [szydlik@uwosh.edu](mailto:szydlik@uwosh.edu)

**Office Hours:** Monday: 1:50 – 2:50 in the Math Lab (Swart 113); Wednesday 11:30 – 12:30 and 3:00 – 4:00; and Thursday 12:00 – 1:40. Please don't let yourself fall behind. I am happy to meet with you. Let me know if you can't make an office hour and so would like an appointment.

**Textbook:** Szydlik, J. and C. Seaman. *Big Ideas in Mathematics for Future Elementary Teachers: Big Ideas in Arithmetic*. This text is available at the University Bookstore.

### Course Outline:

Unit 1: On Being a Mathematician: (3 weeks) problem solving and the language of mathematics.

Unit 2: Arithmetic Thinking (5 weeks): sets, operations, place value, algorithms, the integers and children's thinking.

Unit 3: Number Theory (3 weeks): divisibility, the fundamental theorem of arithmetic, LCM and GCF, and theorems about factors.

Unit 4: Rational Numbers (3 weeks): fractions, fraction operations and models, and decimals.

**Format:** This class may be unlike any mathematics class you have ever taken before. Most class time will be spent solving interesting problems in small groups and discussing problem solving ideas and solutions as a class. Sometimes you will be asked to write up those ideas and solutions for me. Sometimes we will just discuss them. But **always** you are expected to think about the problems, participate in their solutions, and communicate your ideas with others. This format gives you the opportunity to practice skills you will need to be a teacher: listening and making sense of another people's mathematical ideas; explaining your ideas to others (both orally and in writing); understanding that people think about problems in many ways; and learning to help others understand mathematical ideas.

**Assessment:** Your grade in this course will be based on:

- Attendance and participation (5%) It is very important that you are here to participate in solving the problems and contributing to the class discussion. You may miss two classes without penalty (for illness, prior commitments, religious observance, work or anything else you feel is important), and after that you will lose one percentage point of your course grade for each day missed (up to 5%) Coming late or leaving early will count as half a point.
- Written work (20%) This category may include problem write-ups\*, short papers, quizzes or homework sets from the text.
- Three exams (25% each) The exams will be given in class. The dates of the exams are: Friday, February 25<sup>th</sup>; Friday, April 8<sup>th</sup>; and Friday May 13<sup>th</sup>.

Grades will be kept on D2L. If you ever find an error, please let me know. The grading scale will be as follows (after rounding to the nearest percent):

A	93 - 100% of the course points
A-	90 - 92%
B+	87 - 89%
B	83 - 86%
B-	80 - 82%
C+	77 - 79%
C	73 - 76%
C-	70 - 72%
D	60 - 69%
F	0 - 59%

**\*Guidelines for Problem Write-ups:** Problem write-ups should be typed or written in ink and include four sections:

- 1) (3 pts) an explanation of the question or problem: (Convince me you understand the question and define ambiguous terms or notation.)
- 2) (6 pts) a description of your problem-solving *strategies*: (What did you do to work on the problem? Be specific. Include any data, tables, or sketches as appropriate)
- 3) (8 pts) the solution: (what is the answer to the questions?), and
- 4) (8 pts) an explanation of the solution: (*Why* does your solution make sense mathematically? Argue that it is complete - that there are no other solutions - and prove it is correct.)