MA 1413-01 Fall 2011
MWF 11 – 11:50 a.m.

Structure of the Real Number System
Allen 21

Instructor: Kim Walters
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Office Hours: WRF 10:00 – 11:00
Thursda 1 – 2
Others by appointment

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Credit: 3 semester hours

Catalog Description: Three hours lecture. The nature of mathematics; introduction to set theory; the structure and development of the real number system. For Elementary and Special Education majors only. (Prerequisites: a C or better in MA 1313 or an ACT math sub-score of 24)

Calculator: The use of a calculator is this class is NOT allowed.

Conceptual Framework: This course is designed to give pre-service elementary school teachers a working knowledge and understanding of the real number system together with its properties.

Basic Skills Test:

You are required to pass (correctly answer 15 out of 20) a basic skills test in order to pass this class. You will be given four opportunities to successfully complete this. You may not use a calculator. The first time it will be given during class on January 13. Subsequent tries must be arranged with the instructor. If you do not pass this test on the fourth attempt you will automatically receive an F for the course. This requirement must be satisfied by February 29, 2016. This test is taken online using My Math Test in MyLabsPlus. Access code must be purchased.

Instructional Objectives:

1. The student will be able perform basic set operations.
2. The student will be able to add, subtract, multiply and divide whole numbers.
3. The student will gain an understanding of the properties of whole numbers.
4. The student will be able to read and write using Roman Numerals.
5. The student will be able to convert base ten numbers into other bases.
6. The student will be able to convert numbers in bases other than ten to base ten.
7. The student will be able to perform basic computations in bases other than ten.
8. The student will be able to add, subtract, multiply, and divide integers.
9. The student will gain an understanding of the properties of integers.
10. The student will understand and be able to use the divisibility properties.
11. The student will be able to distinguish between prime and composite numbers.

12. The student will be able to find and use the greatest common divisor and the least common multiple.
13. The student will be able to add, subtract, multiply, and divide rational numbers.
14. The student will gain an understanding of the properties of rational numbers.
15. The student will gain an understanding of the properties of the entire real number system.

Topics To Be Covered:

1. Sets and Operations
    a. Basic definitions
    b. Operations on sets
    c. Operations on Whole numbers
    d. Properties of Whole numbers

2. Numeration Systems
    a. Ancient numeration systems
    b. Roman numerals
    c. Bases other than ten
    d. Basic operations in bases other than ten
    e. Estimation techniques

3. Number Theory
    a. Divisibility of natural numbers
    b. Tests for divisibility
    c. Greatest Common Divisor and Least Common Multiple
    d. Prime and composite numbers

4. Integers
    a. Representation of Integers
    b. Operations on Integers
    c. Properties of Integers

5. Fractions and Rational Numbers
    a. Basic concepts of fractions and rational numbers
    b. Operations on fractions
    c. Properties of the Rational number system

6. Decimals and Real Numbers
    a. Operations on decimals
    b. Properties involving decimals
    c. Terminating decimals to fractions
    d. Non-terminating decimals
    e. Real numbers

Group Assignment and Purpose:

You will be placed in groups during the first week of class. These groups can be used for study groups as well as for group projects. It is the responsibility of each of you to get to know the other members of your group and establish contact times. These groups can be beneficial to all of the members if each of you puts forth the necessary effort. You will most likely remain with the same group for the duration of the semester. According to Lindermann (2001), "…learning depends on relationships with others". The relationships that you form within these groups and also those that you will have in your future education courses will depend your understanding of course materials and also how to work with your peers and future colleagues.

Methods of Instruction:

There will be a variety of instructional techniques used in this course. There will be at least two group projects. There will also be some hands on activities. There will be reflective writing assignments to help foster students' understanding of the course material as well as to help you learn to better communicate math as teachers.

Attendance Policy/Classroom Expectations:

Attendance will be recorded at all class meetings. You are all presumably planning to become teachers and therefore should understand the importance of attending class. I expect you to act like the professional educators that you strive to become. With that stated, I expect you to be on time and attentive. **This means that during class there should be no cell phones on (unless there is an emergency), no text messaging, and no reading or studying of other material.** When you have project presentations, I expect you to dress as though you are the teacher.

Assessment of Concepts and Skills/ Evaluation of Student Progress:

There will be four 100 point in class tests during the semester. There will be group projects worth a total of 100 points. There will be several writing assignments which will be worth 50 points and also a final reflective writing assignment worth 50 points. There will also be a required comprehensive final exam worth 200 points. This will allow the student to accumulate up to 800 points. The grading scale is based on the following points and other requirements:

A	720 - 800 points and at least one test grade of 90% or better
B	640 – 719 points and at least one test grade of 80% or better
C	560 – 639 points and at least one test grade of 70% or better
D	480 – 559 points
F	less than 480 points

FINAL EXAM: The final exam for this class is scheduled for Thursday, May 5 at 12:00 pm in Allen 21.

Journal/Reflective Writing:

In order to facilitate an open dialog and also to help you learn to communicate math more effectively as future teachers, you will be keeping a journal in this course. Approximately every two weeks there will be a reflective writing prompt in MyCourses where you will write and turn in the

assignment. You will be able to write your response in MyCourses or you will be able to upload a word document or pdf file. These journal/reflective writing assignments will be graded using a Check/Plus/Minus scale: Check (4) – journal meets expectations; Plus (5) – journal is excellent and the writer very engaging; Minus (2) – journal is too short and does not indicate any time or thought spent.

Final Reflective Writing Assignment:

Research the grade level that you would like to teach and select a topic which we covered in this class which would be covered in that grade. Reflect on what you learned in this course, and describe how you plan to use it to teach your future class about the selected topic. Be sure to discuss how you would use several different approaches in order to reach the variety of students in your class. The assignment should be at least one page in length. This assignment should be written using Microsoft Word and turned in using MyCourses. It is due at 11:59 pm on April 26.

The grade for this assignment will be based on

- Did you select a topic appropriate to the grade level you indicated
- Did you discuss a topic/method discussed in this course
- Is it mathematically correct
- Correct use of grammar
- Correct spelling
- Is it at least one page long

Makeup Policy:

There will be no makeup tests. If you miss a test (excused or un-excused), then the final exam grade will replace that test. *This may be done for one test only*. If you know ahead of time that you must miss a test, you need to see the instructor prior to that test date and make arrangements to take the test early.

Text:

Mathematical Reasoning for Elementary Teachers. Third custom edition for Mississippi State University. Long, DeTemple, and Millman. Pearson Publishers

My Math Test: Students must purchase an access code for My Math Test in MyLabsPlus.

References:

Lindermann, E. (2001). "What Do Teachers Need to Know about Cognition?" *A Rhetoric for Writing Teachers.* 4th ed. New York: Oxford University Press.

Important Dates:
January 15 – Last day to drop without a grade
January 19 – Last day to add a class
February 29 – Last day to pass the Basic Skills Test
March 1 – Last day to drop with a grade of W
Note that there is a fee of $50 for dropping after January 15