MATH 164 | Foundations of Arithmetic

Fall 2018

General Information (Section 002)

Class Time: M – F, 1:00PM – 1:50PM

Location: Samuelson Math Ed Lab 115

Instructor: Dr. Emilie Hancock

Office: Samuelson 218C
Phone: 509.963.2402

Office Hours: Tuesdays 3:30-5:30, Wednesdays 2-4
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Course Description

Reflecting Washington State elementary school mathematics learning standards[1] and the National Council of Teachers of Mathematics (NCTM) standards for Number and Operations[2], this course emphasizes the development of the real number system in conjunction with the four arithmetic operations ($+, -, \times, \div$). Content is presented in a problem solving and exploratory context to support the development of mathematical processes[2] and practices[3].

Major content topics of the course include number sets and their properties; investigation of place value in different bases; meaning and interpretations of four arithmetic operations; standard and alternative algorithms of operations; and investigation of operations on various subsets of real numbers using concrete and abstract models. Exploration of these topics will follow the outline:

Unit 1: Number Systems and Place Value
Book Lessons 2.1 – 2.4

Unit 2: Meaning and Interpretation of Four Arithmetic Operations
Book Lessons 4.1A – 4.4B (omitting fractions and decimals)

Unit 3: Meaning and Representation of Fractions and Decimals
Book Lessons 3.1 – 3.3B

Unit 4: Four Arithmetic Operations using Fractions and Decimals
Book Lessons 4.1A – 4.4B (emphasis on fractions and decimals)

Mathematical problem solving permeates this course. We will focus more explicitly on mathematical problem-solving strategies (Book Lessons 1.1 – 1.6) through weekly 'Portfolio Problem' sessions.

Required Materials

Text: *Explorations in Elementary Mathematical Concepts* by Willard and Shiver, ISBN: 9781465251190

Supplies: 3-ring binder for handouts and notes; labeled tabs to separate binder sections by unit; colored pencils; basic, simple function calculator (cell phone calculators are not allowed).

Canvas Access: I will update the course site on Canvas frequently with announcements, assignments, handouts, and updates on due dates. Please check Canvas *regularly*.

Online Manipulatives: In class we will use various manipulatives. The following links provide some of these manipulatives virtually. You can use them to practice ideas from class and help with assignments.

- *National Library of Virtual Manipulatives*: http://nlvm.usu.edu/en/nav/vlibrary.html
- *Pattern Blocks:* http://www.mathplayground.com/patternblocks.html
- *Cuisenaire Rods:* https://nrich.maths.org/12222

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[1] http://www.k12.wa.us/Mathematics/Standards.aspx

[2] National Council of Teachers of Mathematics. (2000). *Principles and standards of school mathematics.* Reston, VA: National Council of Teachers of Mathematics.

[3] Common Core Standards for Mathematical Practice: http://www.corestandards.org/Math/Practice/

Learning Objectives

Upon successful completion of this course, you will be able to:

- Understand and explain the connections and distinctions among whole numbers, integers, rational numbers, and real numbers.
- Understand and explain the key mathematical structures and ideas underlying procedures used for operating on various subsets of real numbers.
- Persevere in solving mathematical problems involving number and operations using a variety of strategies, and reflect on this process.
- Provide alternative mathematical solutions, evaluate the reasonableness of these solutions, and identify connections among solutions to problems in the area of number and operations.
- Make mathematical conjectures and investigate the reasonableness of these conjectures.
- Develop and evaluate mathematical arguments related to number and operations.
- Select appropriate tools for computation, whether mental computation, estimation, paper and pencil techniques, or technology based approaches.
- Clearly and precisely communicate mathematical ideas about numbers and operations using appropriate mathematical language.
- Make connections between mathematical ideas to build mathematical knowledge and solve problems regarding numbers and operations.
- Represent operations on various subsets of real numbers using a variety of concrete and abstract models.
- Utilize representations as tools to mediate mathematical thinking and problem solving in a dual process of decontextualizing and contextualizing problem situations, such as organizing and communicating mathematical ideas, or modeling and interpreting mathematical phenomena.

Grading Scale

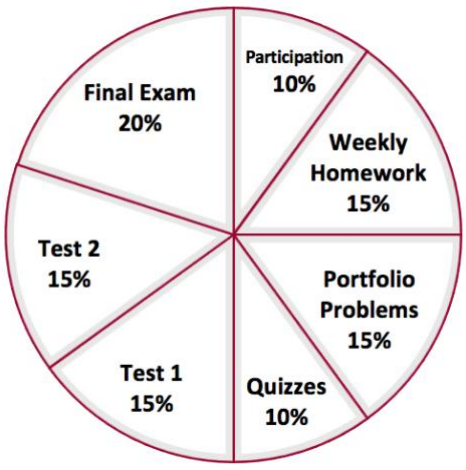
Final letter grades will be determined based on your weighted percent grade, rounded to the nearest whole percent.

Letter Grade	**F**	**D**	**D+**	**C-**	**C**	**C+**	**B-**	**B**	**B+**	**A-**	**A**
Percent	0-59	60-66	67-69	70-72	73-76	77-79	80-82	83-86	87-89	90-92	93-100

Method of Evaluation

Overall grades will be determined as a weighted average using the following percentages:

10%	Participation
15%	Weekly Homework
15%	Portfolio Problems
10%	Quizzes
15%	Test 1 (Units 1 and 2)
15%	Test 2 (Units 3 and 4)
20%	Cumulative Final Exam



Participation (10%): As a member of a learning community, a high degree of professionalism and participation in class is expected. Remember that you are responsible for your learning and conduct. I measure class participation based on the following criteria:

- Arrive to class on time and stay for the entire class. Attendance will be taken every day[4].
- Be present. Focus on learning by being an active participant. Limit side activities and put away cell phones. (If you are anticipating an emergency phone call, just let me know in advance.)
- Come to class prepared. (You may need to finish up activities in between classes.)
- Bring a positive and energetic attitude every day.
- Respect everyone, treat each other with dignity, and encourage all to participate.
- Participate in group work by asking questions, communicating your understanding to your groupmates, and completing the handouts.
- Present your ideas to the class and ask questions when other students present.

Weekly Homework (15%): The main purpose of homework is for you to practice explaining mathematical reasoning related to important course concepts. Homework will be assigned weekly on Thursdays and collected the following Thursday at the beginning of class. Late homework will not be accepted.

Homework should be neat, organized, and stapled. Show your work and explain yourself using appropriate mathematical language and representations. Homework is the responsibility of each individual, but you are encouraged to work with others. With good attendance, I will drop your lowest homework score at the end of the quarter.

Portfolio Problems (15%): Each week we will work on a problem notably more "problematic" than usual coursework, where the key mathematical ideas of the problem are directly related to the current unit. Portfolio Problems will help you (1) deepen your mathematical content knowledge of the current unit, (2) develop your problem-solving skills, and (3) increase awareness of your problem-solving process. After working together in class, you will continue investigating at home and submit a write-up documenting your solution attempt and thinking process. Late assignments will not be accepted.

Bi-Weekly Quizzes (10%): No notes allowed and no make-ups unless you have an excused absence[4]. These quizzes will cover material from the previous two weeks (since the last quiz or test). With good attendance, I will drop your lowest quiz score at the end of the quarter.

Tests 1 and 2 (15% each): No notes allowed and no make-ups unless you have an excused absence[4]. Any missed exam which is not excused will be a zero and will certainly affect your grade in the course. Make-up exams will be a different exam though covering the same material.

Cumulative Final Exam (20%): There will be no early final exam or make-ups, so make travel arrangements accordingly. The final is scheduled for **Wednesday, Dec 5th, 12PM-2PM** in this classroom. No notes allowed.

Academic Honesty

Consult the Student Conduct Code for university policies on student conduct in the classroom, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

[4] Excused absences will not lower your overall grade in this class. Excused absences are those that are both valid and verifiable, i.e. illness, bereavement, and school-related activities. Excused absences do not include holiday travel. Make-up quizzes and exams will be a different exam though covering the same material.

Disability Support Services

Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations.

Location and Contact Information: Hogue Hall 126, 509.963.2214, DS@cwu.edu

Seeking MATH 164 Help

There is no need to struggle alone! Here are a few places to seek help this quarter:

- I have scheduled office hours each week, but am also available by appointment. Note that I can be more helpful if you can tell me what you have already tried. Bonus: I usually have candy.
- Form a study group! Make sure to give yourself individual think time, but then get together to check answers or work through challenges. Meet a few days before the assignment is due so there is still time to seek additional help (like in office hours).
- Free tutoring at the University Math Center
    - Drop by Brooks Library 190 or call 509.963.1270 for an appointment
    - https://www.cwu.edu/learning-commons/cwu-tutoring-math-center

Changes

The instructor reserves the right to amend, adjust, or otherwise modify the outline and syllabus at any time during the course.