

*Foundations of Arithmetic*  
*Math 164, Fall 2016*  
**Five Credits**

Instructor: Dr. Teri Willard  
Office: Bouillon Hall, Room 107E  
Phone: 963-2142  
email: willardt@cwu.edu

Meeting Time: Section 1: 10 am M – F  
Section 2: noon M – F  
Meeting Place: Hertz, Room 120  
Office Hours: 11:00 to 11:50 am, M – F or  
by appointment, or by  
email!

**Text:** *Explorations in Elementary Mathematical Concepts Through Activities (revised printing)*, Willard & Shiver. You will need to bring your book to class every day.

**Supplies:** plenty of lined paper and sharp pencils, calculator (need not be graphing), 2 – 3 colored pocket portfolios (folders), 3-ring binder with 6 dividers

**Course Description:** Structure of the real number system. Properties of and operations on integers, rationals, decimal representation, percentages, proportion, graphing and elementary problem solving. Recommended for the prospective elementary school teacher.

**Course Rationale:** To meet the expectations for mathematics education of elementary teachers, a shift in content, instructional methods, and assessment practices is crucial. The *Principles and Standards for School Mathematics* (NCTM, 2000) outlined the specific changes needed in pre-service mathematics education. This document calls for prospective teachers to be taught using the methods they should model in their own classrooms. It also calls for teachers to have an understanding of the historical development and current applications of mathematics and the use of technology to promote mathematical understanding and to communicate meaning. This course is designed to address these changes in mathematics education and to prepare pre-service elementary teachers to teach important mathematical content to elementary students. This course will use the following reform ideas.

- Content:        *Toward:* A variety of mathematical topics and problem situations  
                  *Away from:* Only arithmetic topics
- Learning:      *Toward:* Investigating problems and exploring concepts  
                  *Away from:* Memorization and rote learning (although, in certain cases these are necessary)
- Teaching:     *Toward:* Questioning and listening  
                  *Away from:* Teaching by telling
- Evaluation:    *Toward:* A variety of sources evaluated by the instructor  
                  *Away from:* Evaluation by tests only
- Expectations: *Toward:* Using understanding of concepts and procedures to solve problems  
                  *Away from:* Only the mastery of isolated concepts and procedures

## Mathematical Practices and Content Areas for Math 164\*:

**MATHEMATICAL PRACTICES:** These CC Standards are based upon the NCTM’s five process standards of problem solving, mathematical reasoning, communicating mathematically, making connections, and representation.

Standards for Mathematical Practices	
CCSS.Math.Practice.MP1 Make sense of problems and persevere in solving them.	CCSS.Math.Practice.MP5 Use appropriate tools strategically.
CCSS.Math.Practice.MP2 Reason abstractly and quantitatively.	CCSS.Math.Practice.MP6 Attend to precision.
CCSS.Math.Practice.MP3 Construct viable arguments and critique the reasoning of others.	CCSS.Math.Practice.MP7 Look for and make use of structure.
CCSS.Math.Practice.MP4 Model with mathematics.	CCSS.Math.Practice.MP8 Look for and express regularity in repeated reasoning.

**CONTENT:** The content areas are *Number and Operation* and *Algebra and Algebraic Thinking*. These topics will be studied while employing various manipulatives and hands-on experiences. The mathematical practice standards will be integrated into the content areas.

Content Topics
<p>1. <b>Number and Operations</b></p> <ul style="list-style-type: none"> <li>• counting and cardinality;</li> <li>• the base 10 numeration system and the significance of place value;</li> <li>• fractions as numbers and the four operations using this subset of the real numbers;</li> <li>• properties of the rational numbers, including the fact that properties are specific to a particular subset of the rational numbers;</li> <li>• performing addition, subtraction, multiplication, and division of rational numbers using a variety of strategies;</li> <li>• recognizing relationships between the four arithmetic operations;</li> <li>• real-world and nonstandard problems involving the four operations on rational numbers.</li> </ul>
<p>2. <b>Algebra and Algebraic Thinking</b></p> <ul style="list-style-type: none"> <li>• identifying and explaining patterns of arithmetic;</li> <li>• generating and analyzing patterns and relationships;</li> <li>• generalizing patterns using symbols, such as algebraic expressions and equations;</li> <li>• extending patterns while solving relevant problems.</li> </ul>

\*Outcomes are adapted from the *Principles and Standards for School Mathematics* (NCTM, 2000) and Common Core State Standards Initiative.

**Work and Assessment:** Please remember that organization, neatness, and legibility count! A variety of assessment methods will be used to determine your level of accomplishment in this course.

**Math Autobiography & Course Reflection (20 pts each; 40 pts total)** See description sheet and due date for this assignment.

**Homework (60 pts):** Expect to read the textbook and do homework daily. Homework will be collected for each unit on the day of the test for that unit (test dates for Tests 1 – 3, but not the final). Please place the homework, well-labeled by section, in a portfolio. The criteria for homework points will be completeness and random answer checks. If you need help with homework, arrange for help from me, classmates, or the math help center.

**Activities (90 pts):** We will be doing a number of activities/worksheets in class. If you do not complete them in class, you will be responsible for finishing them outside of class. Activities will be collected for each unit on the day of the test for that unit (test dates for Tests 1 – 3, but not the final). Please place the activities, well-labeled, in a portfolio. The criteria for activity points will be completeness and random answer checks.

**Notebook – (20 pts):** I suggest a 3-ring binder with 6 sections labeled as shown on the Notebook Checklist. This notebook should be an excellent resource when you enter the elementary classroom.

**Quizzes/Daily Grades/Presentations (150 pts):** Each item in this category will be worth 25 points. There will be at least 7 of these scores, which could include: quizzes (in-class or take-home) and special in-class activities or presentations in class (announced and unannounced). At least **1 (one)** of the scores in this category will be dropped for a total of 150 points. These quizzes will be placed in a portfolio when turned in. **Make-up grades are not possible (includes absences and quizzes that are papers).**

**Tests (500 pts):** There are 3 tests covering several chapters each and a comprehensive final. The first three tests are 100 points each. The final is worth 200 points. Dates will be announced well in advance. Make-up tests will be allowed only for extraordinary circumstances. You must do your own work on tests. Notes, cell phones, headphones, or similar items will not be allowed during testing situations. Calculators, not attached to cell phones, are allowed. **No TEST grades are dropped!**

**Grades: total points = 860 from above**

In order to teach others, you must have a good command of the subject. If you do not understand the material well enough to teach it, both you and your students will suffer. Therefore, your work in this course must be assigned a grade.

**Points and Letter Grades**

93- 100%	90- 92%	87- 89%	83- 86%	80- 82%	77- 79%	73- 76%	70- 72%	67- 69%	63- 66%	60- 62%	<60%
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

## *Additional Topics*

### *Attendance and Professionalism*

If you are to fully benefit from this class, you must attend class. As you prepare to become a teacher, you need to become accustomed to setting a good example for students. Attendance demonstrates professionalism and dedication. High quality work and organization demonstrate professionalism, as well. Today, electronic devices, such as cell phones and personal tablets, are captivating and addictive. Professionalism includes setting these devices out of reach during class time.

### *Academic Honesty*

There are times when it is proper to get help from others and times when it is not. Feel free to ask others for help on homework, take-home quizzes, and activities. You can only learn how to do something new by doing it correctly. During in-class quizzes and tests, you must do your own work. Academic dishonesty will not be tolerated during testing situations.

### *Schedule*

I will keep you informed of the schedule and assignments and you can record them on the calendar I will hand out. Keep the calendar in your notebook.

### *Success*

To be successful, you must work hard and **be organized**. I encourage you to form study groups. You must also study regularly, take notes, do your homework, and read the textbook. You must seek help before you are in trouble and/or too far behind. Never hesitate to ask for help from me, your classmates, or anyone else who can help. I am here to serve you and help you be successful. If you need help, decide what you need help with and write it down. If you are working on a problem unsuccessfully, write down the approaches you have tried. Then seek help with your paper in hand. Write down the helpful hints you receive.

### *The Future*

Finally, after you successfully complete your elementary education degree, do not let this be your last course in mathematics. After you join the ranks as a teacher take more courses, attend workshops, read professional journals, attend conferences, and network with other teachers. Successful teachers continually renew themselves. Teaching can and should be a fulfilling and rewarding career.

### *Additional Note*

Students with disabilities who wish to set up academic adjustments in this class should give me a copy of their “Confirmation of Eligibility for Academic Adjustments” from the Disability Support Services Office as soon as possible so we can discuss how the approved adjustments will be implemented in this class. Students without this form should contact the Disability Support Services Office, Bouillon 205, or [dssrecept@cwu.edu](mailto:dssrecept@cwu.edu) or 963-2171.

*Good luck* in this course! I hope you find it enjoyable and never hesitate to talk to me if you have any problems.