

FOUNDATIONS OF ARITHMETIC

MATH 164 | FALL QUARTER 2017

INSTRUCTOR:

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COURSE OVERVIEW:

The foundation of every activity will be mathematical problem solving and reasoning. Specific content will include concepts and procedures of: (a) numeration systems, (b) conceptual understanding of fractions, (c) models and properties for addition, subtraction, multiplication, and division of whole, integers, and rational numbers, and (d) number theory.

COURSE RATIONALE:

To meet the expectations for mathematics education for elementary teachers a shift in content, instructional and assessment practices are crucial. The Curriculum and Evaluation Standards of School Mathematics (NCTM, 2000) outlines the specific changes needed in pre-service mathematics education. "Prospective teachers must be taught in a manner similar to how they are to teach--by exploring, conjecturing, communicating, reasoning, and so forth." In addition, "all teachers need an understanding of both the historical development and current application of mathematics. Furthermore, they should be familiar with the power of technology." This course is designed to address these changes in mathematics education and prepare preservice elementary teachers with the necessary mathematical content to implement the different pedagogy modeled in this class. Traditionally elementary mathematics has had a preoccupation with computation and other traditional skills. The vision of this course is to initiate the following instructional reforms.

COURSE DELIVERY AND LAYOUT:

This course is delivered through a combination of face-to-face class sessions and Online Canvas. You are expected to log into Canvas frequently. It is organized into eight modules that include in-class activities, mathematical exercises and problems (completed out-of-class but discussed in following class sessions), on-line quizzes, in class exams, and on-line discussion prompts. All these assessments will be in the calendar:

- Module mathematical exercises and problems - check of written work and preparation to participate in class discussions.
- Module on-line quizzes - unlimited attempts on quizzes, use quizzes to prepare for module written exams.
- Module written exams - 30 minute exams aligned with the exercises and on-line quizzes, students may re-take similar problems that they miss to earn back half of the missed points.
- Module discussion writing - students will explain how module activities reveal the connection between a main concept and multiple procedures studied in the module.
- Final exam during finals week.

Required text: Teri Willard and Janet Shiver. (2013). *Explorations in Elementary Mathematical Concepts through Activities*.

Software and Hardware Required

- Access to CWU Canvas. Documents in this course will be presented in .pdf. You will need Adobe Reader which you can obtain for free at <http://get.adobe.com/reader/>. Review the complete [Technology Requirements \(Links to an external site.\)Links to an external site.](#) for CWU online students.

Here is the abbreviated version:

- Internet connection
- Mac OS x 10.9 and higher or
- Windows Vista or higher--Windows 7 is recommended
- Up-to-date version of Firefox or Chrome
- [Run the browser check \(Links to an external site.\)Links to an external site.](#) to check your system settings.

COURSE OBJECTIVES:

By the end of the course, teacher candidates will be able to:

Outcomes	Assessment	Standards
Mathematical Problem Solving: <i>Teacher candidates know, understand, and apply the process of problem solving in each mathematical content area. As a result, candidates:</i>	Exercises, Quizzes, Tests, and Writing	EM 1D
Mathematical Reasoning: <i>Teacher candidates reason, construct, and evaluate mathematical arguments; also interpret and compare information from a variety of sources in each mathematical content area. As a result, candidates:</i>	Exercises, Quizzes, Tests, and Writing	EM 1D
Mathematical Communication: <i>Teacher candidates communicate their mathematical thinking orally and in writing, using appropriate mathematical language and notation to clearly and effectively express or present ideas and information in each mathematical content area. As a result, candidates:</i>	Exercises, Quizzes, Tests, and Writing	EM 1D
Mathematical Connections: <i>Teacher candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding. As a result, candidates:</i>	Exercises, Quizzes, Tests, and Writing	EM 1D
Number and Operation:		
Analyze and explain the mathematics that underlies the procedures involving operations with whole, integer, and rational numbers.	Exercises, Quizzes, Tests, and Writing	1D5
Recognize the meaning and use of place value in representing whole numbers and finite decimals, comparing and ordering numbers, and understanding the relative magnitude of numbers	Exercises, Quizzes, Tests, and Writing	1D5
Demonstrate proficiency in real number computation using multiple algorithms, mental mathematics, and computational estimation.	Exercises, Quizzes, Tests, and Writing	1D5
Demonstrate understanding of, represent, and use whole numbers, integers, and fractions.	Exercises, Quizzes, Tests, and Writing	1D5
Demonstrate understanding of the meaning of operations on whole numbers and fractions	Exercises, Quizzes, Tests, and Writing	1D5
Provide equivalent representations of fractions, decimals, and percents.	Exercises, Quizzes, Tests, and Writing	1D5
Demonstrate understanding of the fundamental ideas of number theory (e.g. divisibility, factoring, multiples, prime factorization, prime and composite)	Exercises, Quizzes, Tests, and Writing	1D5
Compare properties of number systems.	Exercises, Quizzes, Tests, and Writing	1D4
Demonstrate knowledge of the historical development of number and number systems, including contributions from many cultures.	Exercises, Quizzes, Tests, and Writing	1D2

ASSIGNMENTS AND EVALUATION GUIDELINES:

The instructional and assessment strategies for this course are designed to enable your achievement of the course performance outcomes. The instructors will give you feedback to support progress in meeting performance outcomes.

Assignment	Points
Exercises for each Module	80
Practice quizzes for each Module	80
Written Exam for each Module	400
Written Discussion for each Module	160
Final	100
Total Points	820

Grading Scale

93-100% = A, 90-93% = A-, 87-90% = B+, 83-87% = B, 80-83% = B-, 77-80% = C+, 73-77% = C, 70-73% = C-, 67-70% = D+, 63-67% = D, 60-63% = D-, 0-60% = F Please see the CWU Catalog for the eligibility for an incomplete (I).

Performance Expectations

All of the assignments and directions can be found on Canvas. If a course deadline was missed, assessment alternatives are left up to the discretion of the instructors.

COURSE POLICIES:**Instructor Feedback/Communication**

The instructor will read and reply to all e-mails promptly. You will receive specific feedback in the form of electronic comments appended to your electronic submission. I will use the Announcements tool in CANVAS to communicate changes to the course and other course information.

Suggestions for Success

Take the responsibility for your own achievement of these performance objectives. You can get individual help by e-mail or in person in my office. If at any time you have trouble-using Blackboard or do not understand an assignment make sure to contact the instructor. Use the activities, assignments, assessments and people such as the instructor to insure that you understand the mathematical teaching concepts and can demonstrated this understanding in the form of the performance objectives.

Student Feedback/Communication

I welcome all feedback on the course. My preferred method of communication with individual students is via email. I am also available for office hours. If you experience a legitimate emergency (according to my standards) that will prevent you from completing required coursework on time, I expect you to communicate with me at the earliest reasonable opportunity. Please state the nature of the emergency, and when you expect to turn in the coursework.

Submitting Electronic Files

All electronic files must be submitted in .doc or .pdf format. If you do not have Microsoft Word, you can download Open Office Writer for free at <http://www.openoffice.org/>. This will allow you to open the instruction files, make changes and save in .doc or .pdf.

Late and Uncompleted Work

- If extenuating circumstances exist, contact instructor.
- All course assignments must be completed to pass the course.

UNIVERSITY POLICIES:**AMERICANS WITH DISABILITIES ACT (ADA).**

Students with disabilities who require academic adjustments in this class should have documentation of their "Confirmation of Eligibility for Academic Adjustments" from the Disability Support Services Office. Students with disabilities without this form should contact the Disability Support Services Office, Bouillon 205 or dssreceipt@cwu.edu or 963-2171 immediately. This should be provided to the instructor as soon as possible so we can meet to discuss how the approved adjustments will be implemented in this class.

ACADEMIC HONESTY

Academic dishonesty is defined in the CWU Student Conduct Code (11.B). If academic dishonesty is confirmed, the instructor may issue a failing grade for the specific assignment and/or for the course. Withdrawing from a course does not excuse academic dishonesty. In circumstances when academic dishonesty is confirmed, a W can be replaced by a letter grade.

Collaboration is encouraged for developing your knowledge and skill, BUT

- The final product must be your original work. Your thoughts are considered original if you connect your interpretation of the reading with your personal experience and values, and you openly acknowledge where you got information.

- Sometimes it is inappropriate to consult others at all. For instance, the two written examinations are structured as take-home exercises requiring a professional integrity to work independently.

ACADEMIC MATURITY

In this class we emphasize a disposition toward working independently because teachers function autonomously without the frequent feedback students enjoy. In this course, you are expected to read the written word carefully for its intended meaning and purpose. Unfortunately, many students are accustomed to a much more passive role. Worse, some students cannot make a decision without the personal attention of the instructor. Strategies for being independent will be shared in this class and your sincere effort to develop independence will be readily observed. If you have difficulty reading, you must take the initiative to seek help but in a timely manner, that is, well in advance of any target dates.

Calendar

The calendar with all dates class will meet, major due dates for assessments can be found in CANVAS.