Foundations of Arithmetic
Math 164, Winter 2010
Five Credits

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Meeting Time: 10:00 to 10:50 am
             Monday–Friday
Meeting Place: Hertz, Room 120
Office Hours: 11:00 to noon: Monday–
             Thursday, by appointment,
             or by email!

Texts: *A Problem Solving Approach to Mathematics for Elementary School Teachers*, 10th Edition, by Billstein, Libeskind, and Lott **and**
Mathematics Activities for Elementary School Teachers, 10th Edition, by Dolan, Williamson, and Muri

Supplies: plenty of lined paper and sharp pencils, calculator (need not be graphing), 2 – 3 colored pocket portfolios (folders), 3-ring binder with 7 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 for elementary teachers, a shift in content, instructional methods, and assessment practices is crucial. The *Principles and Standards for School Mathematics* (NCTM, 2000) outlines 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

Learner Outcomes for Process and Content Areas*:

PROCESS OUTCOMES: The five process standards are problem solving, mathematical reasoning, communicating mathematically, making connections, and representation. After completing this course, you will be able to:

Performance Outcomes	Performance Outcomes
1. Problem Solving • define a problem; • use a variety of appropriate strategies to solve problems; • monitor and reflect on the problem solution and the process of mathematical problem solving.	4. Connections • recognize and use connections among mathematical ideas; • recognize and apply mathematics in contexts outside of mathematics.
2. Reasoning and Proof • make and investigate mathematical conjectures; • develop mathematical arguments or proofs.	
3. Communication • organize and consolidate your mathematical thinking through communication; • communicate your mathematical thinking coherently and clearly; • use the language of mathematics to express mathematical ideas precisely.	5. Representation • create and use representations to organize, record, and communicate mathematical ideas; • select, apply, and translate among mathematical representations to solve problems.

CONTENT OUTCOMES: The three content areas in this course are *Number and Operation* (numeration, number systems, operations, estimation), *Algebra and Algebraic Thinking* (patterns, functions, symbolic representations), and *Data Analysis* and *Probability* (data displays, interpretation of data, basic probability). After completing this course, you will be able to

Performance Outcomes
1. Number and Operations • demonstrate understanding of numbers, ways of representing numbers, relationships among numbers, and number systems; • demonstrate understanding of meanings of operations and how they relate to one another; • compute fluently and make reasonable estimates.
2. Algebra and Algebraic Thinking • demonstrate understanding of patterns, relations, and functions; • represent and analyze mathematical situations and structures using algebraic symbols; • use mathematical models to represent and understand quantitative relationships, for example, use graphs, tables, and equations; • analyze change in various contexts.
3. Data Analysis and Probability (may be limited or optional) • demonstrate understanding of and apply basic concepts of probability, for example, use experiments and simulations; • organize and display data using appropriate means such as tables and graphs; • use measures of central tendency to describe data sets; • explain different interpretations of the same data set and how statistics can be used and misused to support different points of view.

*Outcomes are adapted from the *Principles and Standards for School Mathematics* (NCTM, 2000).

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 (**15** pts): See description sheet and due date for this assignment.

Homework (**0 formal** pts): Expect to read your textbook and do homework daily. Homework will not be picked up, nor will it be graded. However, homework problems may appear conveniently on quizzes and tests. If you need help with homework, arrange for help from me, classmates, or the help center.

Activities (**30** 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. These will be due and assessed near the end of the quarter and housed in your notebook (see below).

Writing Assessments (**75** points) You will be writing papers demonstrating your fulfillment of specific outcomes for this class and your understanding of standards. You will receive a handout and rubric describing each assessment. These assignments have firm due dates that are on your calendar. The instructor reserves the right to deduct points for any late papers.

Notebook (**15** pts): Near the end of the quarter, you will turn in a 3-ring binder with 7 sections labeled Introduction, Information, Notes, Activities, Quizzes/Tests, Assessments, and Resources. I will discuss in class what will be contained in each section.

Quizzes/Daily Grades/Presentations (**140** pts): Each item in this category will be worth 20 points. There will be at least 8 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 140 points. **Make–up grades are not possible, includes absences and late 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. The final is to be taken at the scheduled time. 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.

Grades: total points = 775 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.

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.

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 (Read each lesson before you come to class. Most material will be presented in class from a different perspective than 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 this course, 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 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.