**Instructor**:
**Class meetings:**
**Office Hours**:
**Office Location**:
**Office Phone Number**:
**E-mail address**:
**Website**:
**Materials:**

- Bookstore has these amazing notebooks with pages that are half graph paper half lined paper. Get one of them.
- Small folder where you'll keep all the class handouts and work – punch holed.
- I have no strong feelings about any of the textbooks. You're welcome to check out a book from a library in order to have a reference. Some of the authors are (search individually for author and include mathematics in the title field): Musser, Beckmann, Billstein, Bassarear, Baldridge, etc.

**Course Content**: This course is the first in a two-semester sequence of required mathematics courses for elementary school teachers. The sequence is designed to help K-6 pre-service teachers develop a conceptual framework for mathematics, especially for those aspects normally experienced in primary and elementary school.

It is often wrongly assumed that having successfully finished high school is enough of a preparation for teaching K-6 students. Teaching mathematics requires a lot of specialized knowledge, knowledge that other professionals, although having had advanced mathematics courses, do not necessarily possess. Your job will be to prepare lessons and determine mathematical goals of activities. You will need to anticipate students' responses, the problems they might face and how to help them navigate through the new material. You will have to generate easier problems if you realize that your students have trouble with the ones you've given, or harder ones when you need to challenge your students more. You will need to choose good questions to ask, and learn how to lead classroom discussion. You will need to be able to evaluate explanations and arguments. You will need to listen to your students and their reasoning and decide whether what they are saying makes sense and why. The goal of this course is to, apart from revisiting and solidifying your knowledge of mathematics that is needed to teach K-6, acquire some of this specialized mathematical knowledge needed for teaching. We expect that you will see yourself as a teacher in both places rather than as a student here and an observer in school.

**Expected Learning Outcomes:** After the completion of this course the students will

- Demonstrate understanding of numbers as abstract notions and learn the distinction between numbers and numerals. They will understand that numbers serve different purposes: cardinal, ordinal and nominal.
- Know that base 10 number system is based on groupings and how to use different representations of numbers to illustrate the structure of the base 10 system.
- Understand the operations on whole numbers and interpret operations in different ways, comparison and non-comparison approach to subtractions, partitive and measurement approach to division, for example. They will explain how the standard algorithms rely on decomposing numbers represented by their digits and properties of operations. Students will be able to solve and write word problems depending on the view of the operation they attend to.

- Understand how the decimals extend base 10 number system and view decimals as addresses on a number line. They will be able to how the standard algorithms for computations extend to the decimals.
- Know different views of fractions as describing parts of a whole, quotients of two whole numbers and operators. They will extend the operations of whole numbers to fractions. They will explain the rationale behind equivalent fractions and procedures for adding, subtracting, multiplying, and dividing fractions. Students will learn what decimal representation of rational numbers must look like and explain why non-repeating non-terminating decimal numbers cannot be rational.
- Know that ratios give relative comparison between two quantities and that equivalent fractions represent same ratios. They will be able to apply knowledge of ratios in problems using variety of representations, and solve proportions in non-algebraic ways.
- Develop understanding of prime decomposition of positive integers and learn the fundamental theorem of arithmetic.
- Know the difference between least common multiple and greatest common divisor. They will understand the connections between the division algorithm and Euclidean algorithm.

**Note:** This is NOT a class about HOW to teach mathematics, but rather about various aspects of content that you will need to have a good control over.

**Methods of teaching and learning:**

Almost every day during class, you will be working in groups on various activities. Expect to turn these in at any time during class. I expect you to come to every class on time, turn assignments when they are due, participate actively in classroom discussions and activities, and take notes in class. Because you are preparing to be a teacher, your participation needs to reflect professional learning. This means it will not just be judged on the basis of its content but also on the basis of its form: You will need to speak audibly, connect with your audience, modulate the words you utter, and use standard English. I will give you feedback on what you say and on how you say it, in the understanding that it matters to you because so much of our work as teachers includes speaking for others to understand us. For the reason that you need to be prepared to think on your feet and talk in public you should expect to be called on even when you don't volunteer. It is fair game (and deserves all our respect) if you ask for time to think about something or if you say, I don't know but here is how I would find out. For the same reason, I expect you will give me feedback when I speak in ways that are difficult to understand or to hear and that you will accept that at times I also need to regroup and think for a while.

**Evaluation methods and criteria:**

- **Class Tests:** The class tests are tentatively scheduled for **January 31st, February 28th** and **March 28th.** If any changes need to be made in this schedule, they will be announced in class a week prior to the test date.[1]
- **Assignments:**
  - Throughout the semester you will be submitting individual and group work. There will be different kinds of assignments: preparation for class, practice and assessment. Some of them will be graded on completion, others on correctness. Some you will have to resubmit once you receive feedback on it. On all of them I expect: you will do the best

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[1] Remind me to comment on test review and preparation

you can, you will give each assignment your full effort and you will complete all of them on time. Assignments should be neat, legible, and stapled. For most homework problems, you should explain your answer, as if to a classmate, rather than just writing the final result. Here are a few guidelines:

- Write in complete sentences.
- You needn't recopy the problem statement.
- Explain your reasoning thoroughly. Remember, you are writing as if for someone who doesn't already know the answer.
- Don't explain your reasoning excessively. Remember, you are writing as if for a classmate, who is just stuck on this particular problem.
- When resubmitting the assignments, do not erase. Explain where the problem was, and how you fixed it. We learn a lot from our mistakes, and your students might make the same ones.

- You are welcome to work with others on all of your assignments, but everything you turn in must reflect your own understanding.
- You should expect that homework will be assigned every day with understanding that some assignment will need longer to complete and some will be due the next day. [2]
- Late assignments will be accepted for comments, but not for grades.

- **Practicum:** Each student will spend **six hours** in an elementary school classroom, three periods observing and three periods working with one or two children in the classroom. This classroom experience will be the subject of some class discussion and an assignment so please make sure to complete your observations by **February 28th** and turn in your permission slip. After that you will spend 3 hours working with one or two children: first interviewing, then teaching (not tutoring and not doing worksheets that teacher assigns). The practicum report is a typewritten analysis of your mathematical work with the children. This report is due **April 4th** and will be discussed in detail in class.  Please note: You must complete the practicum in order to pass the course.
- **Final Examination:** The cumulative final exam is scheduled on **Tuesday, April 30, 2013 6:00 – 8:00 pm in LCB121.**

| Assignments + Portfolio | **15%+ 5%** |
| --- | --- |
| Midterms | **30%** |
| Participation | **10%** |
| Practicum | **15%** |
| Final exam | **25%** |
| **TOTAL** | **100%** |

- **ADA Statement:** The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

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[2] Remind me to comment on time allocation.

- In case you need it, but I hope you don't: Last day to drop the class is 1/16, and last day to withdraw from the class is 3/1.

- **Short overview of the class:**

| Week | Date | Topic |
|------|------|-------|
| 1, 2 | 1/7 – 1/17 | Number systems, whole numbers |
| 3, 4, 5 | 1/21 – 2/7 | Operations on whole numbers |
| 6 | 2/11 – 2/14 | Estimation. Mental mathematics |
| 7, 8 | 2/18 – 2/28 | Divisors, multiples |
| 9, 10 | 3/4 – 3/ 21 | Rational numbers |
| 11, 12 | 3/25 – 4/4 | Ratio, rates, proportions |
| 13 | 4/8 – 4/11 | Irrational numbers |
| 14 | 4/15 – 4/18 | Integers |
| 15 | 4/22 – 4/25 | Putting it all together! |
| | 4/30 | Final Exam |

- **Welcome!**