**Math 5376:** Constructing Rational Number and Operations
Spring 2015

**Instructor:** Dr. Kathryn Rhoads
**Email Address:** kerhoads@uta.edu

**Section information:** MATH 5376-001
**Time and Place of Class Meetings:** PKH 309, Tuesday, 5:00 pm – 7:50 pm

**Office Number:** PKH 407
**Office Telephone Number:** (817) 272-2983
**Office Hours:** Tuesday 3:45 pm – 4:45 pm & 8:00 pm – 8:30 pm, or by appointment

**Description of Course Content:** This course will address the meanings and representations of rational numbers and the development of computations on rational numbers from algorithms for whole numbers, including concrete models for operations on fractions and decimals. Discussion will include research on the learning and teaching of operations on rational numbers. Additional topics covered include divisibility tests and factoring. Assignments require interaction in K-8 field settings.

**Prerequisites:** MATH 5375 (Constructing Whole Number and Operation)

**Student Learning Outcomes:** After completing this course, students should be able to:
- Identify and use appropriate representations of rational numbers in teaching situations, including conceptual, contextual, concrete, pictorial, and symbolic models
- Analyze student thinking regarding rational numbers and elementary number theory
- Design and implement research-based lessons to teach rational number concepts, including the development, selection and sequencing of problems
- Justify, in simple terms, common algorithms for operating on rational numbers
- Explain the correspondence between common fractions and decimals
- Explain common divisibility tests
- Use prime factorizations to determine the number of factors a given number has, or to find a number with a given number of factors

**Required Textbooks and Other Course Materials:**
- ISBN: 9780133733136
  Developing Mathematical Ideas. (2009). *Number and Operations, Part 1. Building a System of Tens: Calculating with whole numbers and decimals Casebook* (2nd Ed.). Boston, MA: Pearson.

- ISBN: 0769001726
  Developing Mathematical Ideas. (1999). *Number and Operations, Part 2. Making Meaning for Operations Casebook.* (1st Ed.). Parsippany, NJ: Dale Seymour Publications.

- ISBN: 9780325030531
  Empson, S. B., & Levi, L. (2011). Extending *Children's Mathematics: Fractions and decimals. (Innovations in cognitively guided instruction.)* Portsmouth, NH: Heinemann.

- You will be expected to use the university library databases to obtain some of the journal articles we will read in this course. A list of articles will be provided in class, and the library can offer assistance in finding these articles. Please visit http://www.uta.edu/library

- Additional readings and materials will be provided in class or on the Blackboard site for this course.

**Assignments:** In this course, you will submit regular journal entries in addition to 4 major assignments. Brief descriptions of these assignments follow. Further guidelines for all assignments will be provided in class.

1. Journal: Most weeks, you will write a short (about one page) reflection in response to a prompt given in class. Some involve "action research" reports in which you will write about your own students' mathematical work. Your journal entries will serve to document your preparation for class each day (and your growth over time). You will often use and discuss your responses in class, within your small groups and in large group.

2. Student interview: You will conduct an interview with a student from your class to assess her/his understanding of a specific mathematical topic. You may choose the student and topic, but the interview should involve a major topic from this course. You will provide a written summary of the interview that includes your analysis of the student's thinking.

3. Case study: You will write a short (roughly 3–5 pages) case study describing a mathematical discussion involving one or more students, similar to these cases. The episode you choose should highlight some aspect of children's mathematical thinking, as well as your reflection on larger teaching issues it raises for you. It must also center on a mathematical topic involving rational number and operation, or number theory.

4. 2-problem paper: As a summative evaluation of the mathematical portion of this course, you will submit a paper detailing your mathematical work on a college-level problem from this course which you solved completely, and a problem from K–8 mathematics which you believe is related.

5. Lesson paper: As a summative evaluation of the pedagogical aspects of this course, you will develop or select an exemplary lesson which fosters learning these concepts, teach and document the lesson, and give a short (10-minute) presentation to the class on it. A preliminary draft of the selected problem and lesson idea (not [necessarily] yet taught) is due March 24. Final documentation is due April 14, and the presentations will be given May 12.

**Participation & Professionalism:** Reading lists will be provided, and you are expected to complete required readings before class. You are expected to actively participate in classroom activities and discussions, and you are encouraged to offer suggestions and conjectures even if you aren't sure of the answers. In addition, you are expected to work with others, respect others' ideas, and celebrate others' successes. Cell phones and electronic devices should be silenced and should only be used for class-related activities. In emergencies, brief calls can be taken in the hallway.

**Attendance:** At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I have established the following attendance policy:

*Because this course relies heavily on group participation and meets only once per week, more than one absence from our weekly class or excessive tardiness will lower your final grade.*

**Course Grades:**

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|---|---|
| Journal Entries | 10% |
| Student Interview | 20% |
| Case Study | 20% |
| 2-Problem Paper | 20% |
| Lesson Paper | 20% |
| Participation & Professionalism | 10% |
| Total | 100% |

**Course Schedule:**

| Date | Topic(s) | Readings/ Cases due | Assignments due |
|---|---|---|---|
| January 20 | Representations of fraction | Reading List 1 | |
| January 27 | Fraction as part-whole and ratio | Reading List 2 | Journal 1* |
| February 3 | Fraction as quotient | Reading List 3 | Journal 2* |
| February 10 | Adding & Subtracting fractions | Reading List 4 | Journal 3* |
| February 17 | Multiplying fractions & Fraction as operator | Reading List 5 | Interview* |
| February 24 | Dividing fractions | Reading List 6 | Journal 4* |
| March 3 | Algorithms for dividing fractions | Reading List 7 | Journal 5 |
| **March 10** | **NO CLASS—Spring Break** | | |
| March 17 | Representations & Place value for decimals | Reading List 8 | Case study* |
| March 24 | Relationships between fractions & decimals | Reading List 9 | Journal 6* Lesson draft |
| March 31 | Adding & subtracting decimals | Reading List 10 | Journal 7 |
| April 7 | Multiplying & dividing decimals | Reading List 11 | Journal 8 2PP drafts |
| April 14 | Number systems and infinities | Reading List 12 | Lesson paper* |
| April 21 | Divisibility tests | | Journal 9 2PP drafts Draft feedback |
| April 28 | Factors I | | 2-problem paper |
| May 5 | Factors II | Reading List 13 | Journal 10 |
| May 12 | Final presentations | | Presentations |

*As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. –Kathryn E. Rhoads*

**Additional Information**

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).
*\*The last day to withdraw from this course is April 3\**

**Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

**Title IX:** The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

**Academic Integrity:** Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

**Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

**Final Review Week:** A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. **As you leave the classroom, turn left and exit down the stairs at the end of the hall.** When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

**Student Support Services**: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

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**Emergency Phone Numbers**: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911.