University of Alabama at Birmingham
Course Syllabus: MA 316/516 - 2D Numerical Reasoning

Instructor: Tami Puchta
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Office Hours: By appointment
Credit Hours: 3
Class Meetings: Tues./Thurs. 12:30-1:45

Required Text: There is no required text for this course, but there will be assigned readings provided in class.

You are REQUIRED to have a Blazer ID and UAB email account. You will need a 3-ring binder with 3-5 tabs, graph paper, a ruler, color pencils, and scissors and tape for various tasks.

I. Course Description: This mathematics course will focus on numerical reasoning and problem solving. It is designed around the Common Core State Standards and NCTM standards and is intended for future elementary and secondary teachers. Working in small groups and individually, students will investigate a variety of problems using numerical reasoning. Students will also explore models to help K-8 students understand operations on and properties of whole numbers, fractions, percentages, integers, rational numbers, decimals, irrational numbers, and real numbers. Students will investigate problems focused on ratio and proportional reasoning. This is an inquiry-based course in which students will use mathematics to describe, understand, and solve problems. Each topic will be studied with emphasis on reasoning, problem solving, developing mathematically convincing arguments, and the clear communication of mathematical ideas. This course emphasizes conceptual understanding as well as procedural fluency and stresses the importance of examining problems from multiple perspectives: numerical, verbal, algebraic, graphical, and geometric. Students will have mathematics homework as well as out-of-class readings which will require written reflections.

II. Student Learning Outcomes: By the end of this course you should be able to:
• Understand and put into practice the Common Core State Standards for Mathematical Practice.
• Solve problems related to and demonstrate understanding of the Common Core State Standards for Mathematical Content in the following domains:
  o Number and Operations in Base Ten
  o The Number System
  o Counting and Cardinality
  o Number and Operations—Fractions
  o Ratios and Proportional Relationships
• Model and solve a variety of theoretical and applied problems.
• Demonstrate a strong conceptual understanding of numbers (whole numbers, fractions, equivalent fractions, percentages, integers, rational numbers, decimals, irrational numbers, real numbers), operations on them, and properties of them.
• Demonstrate knowledge of concepts of number and number relationships, number systems, number theory, estimation, and computation in the context of problem solving.
• Convert between fractions, decimals, and percentages.
• Compute and estimate fluently using integers, rational numbers, and decimals, including both written and mental strategies.
• Understand prime and composite numbers, factorization, and common divisors and multiplies.
• Model and solve problems involving ratios, rates, and proportional reasoning, and distinguish between proportional and non-proportional relationships.
• Use and convert units appropriately when solving problems.
• Communicate mathematical ideas orally and in writing.
• Demonstrate a positive disposition toward and persistence and reflection in doing mathematics.

The goal of this course is that you become mathematically powerful students and that you become competent and confident problem solvers. The content and experiences in this course will lead you toward this goal. My role as the instructor will be to guide and support you as you make sense of mathematics. My role is not to tell you everything about the subject, nor is it to answer all of the questions that will arise as you engage in problem solving. You will at times experience confusion and perhaps frustration. This is a natural part of the learning process. I will try to help you reflect and work your way out of confusion before your frustration becomes debilitating to your learning. Don’t be afraid of wrong answers. You will not be put on the spot or embarrassed based on a response. Sometimes learning occurs by multiple attempts down wrong paths until you find a correct path.

You will learn while working in teams, in pairs, and as an individual as you solve problems. Collaboration with others is a valued method of learning. Listening to others as you engage in collaborative problem solving will help you see a variety of points of view and several ways of solving a problem. In groups, you are not to ‘teach’ someone how to solve a problem and you are not to direct others to think in a certain way. Each person must think for her/himself
and make sense of the situation. For many problems, I will insist that you not be satisfied with simply finding one way to solve a problem. Instead, I will push you solve problems in multiple ways. Getting the right answer is not the only goal in solving a problem. Understanding how you got to the answer is also an important goal, as is being able to communicate your understanding to others. While collaborative learning is desired, you are at the same time individually accountable for learning the material.

III. Course requirements:

1. **Attendance** and **active participation** in all sessions.

2. **Collaboration**: You may collaborate on solving the homework problems. I hope you will learn from one another and benefit from working together. However, it is imperative that you are able to solve problems on your own on the exam. A good guideline is that after you have solved a homework problem, you should feel confident that you are able to explain your solution to the class.

3. Complete individual menus of problems, group tasks, and homework problems.

4. Complete article reviews and other readings.

5. Complete an in-class Midterm Performance Task and a Final Performance Task.

6. Develop a final Mathematics Portfolio.

7. Have a positive and productive disposition toward yourself, your classmates, and mathematics. Be respectful of others as you share ideas.

IV. **Course Grades**: Course grades will be determined on a typical 10-point scale by the following measures:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Item 1.</td>
<td>Scores on completed Math Menus</td>
<td>20%</td>
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<tr>
<td>Item 2.</td>
<td>*Attendance and active participation (instructor’s judgement)</td>
<td>05%</td>
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<tr>
<td>Item 3.</td>
<td>Reading Reflections</td>
<td>10%</td>
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<tr>
<td>Item 4.</td>
<td>Midterm Performance Assessment</td>
<td>25%</td>
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<td>Item 5.</td>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Item 6.</td>
<td>Final Course Portfolio</td>
<td>10%</td>
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</table>

*Since group participation is an essential component of this course, missing more than 25% of classes with unexcused absences will result in a grade of F for this course.
Students Enrolled in MA 516: In addition to the above requirements, you will be expected to submit additional items for the Final Mathematics Portfolio, Menus, and Assessments.

V. Course Policies:

1. **Attendance:** Attendance every day is expected and essential to success. Please be on time to class and let me know as soon as possible if it is necessary to miss class.

2. **Cell Phones and Laptops:** Let me know in advance if there is an important reason for you to be accessible by phone during class. Please silence your cell phones and make sure you are not distracted by them so you can be fully present to the members of our class and your small groups. Laptop computers are not allowed unless otherwise approved by the instructor.

3. **Exams:** A make-up exam will be scheduled only when requested within the first two days of the term for a valid and verifiable reason or in case of an extreme emergency.

4. **Withdrawal:** You are expected to be aware of official UAB withdrawal policies.

5. **Student Conduct Codes:** You are expected to be aware of, and rigorously adhere to UAB code of conduct with regard to academic honesty and inter-personal relations.

6. **Syllabus:** This syllabus is subject to changes announced in class.

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The University of Alabama at Birmingham is committed to providing an environment that is free of bias, discrimination, and harassment. If you have been the victim of sexual discrimination, harassment, misconduct, or assault we encourage you to report the incident. UAB provides several avenues for reporting. For more information about Title IX, policy, reporting, protections, resources and supports, please visit [http://www.uab.edu/titleix](http://www.uab.edu/titleix) for UAB’s Title IX Policy and UAB’s Equal Opportunity and Anti-Harassment Policy.

UAB is committed to providing an accessible learning experience for all students. If you are a student with a disability that qualifies under Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act, and you require accommodations, please contact Disability Support Services for information on accommodations, registration and procedures. Requests for reasonable accommodations involve an interactive process and consist of a collaborative effort among the student, DSS, faculty and staff. If you are registered with Disability Support Services, please contact me to discuss accommodations that may be necessary in this course. If you have a disability but have not contacted Disability Support Services, please call 934-4205 or visit [http://www.uab.edu/dss](http://www.uab.edu/dss).