

University of Alabama at Birmingham
MA 316-2D Numerical Reasoning
Fall 2023 T/Th 12:30-1:45pm HHB Rm 226



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Office Hours: 2:00-4:30 on Wednesday Room 4039 University Hall OR
make an appointment with me to meet either in person or via Zoom

Time Zone: Central Time Zone

Preferred Methods of Contact: Email is my preferred method of contact if you have questions.

Please expect a response within 24 hours on weekdays and a slower response on weekends. Include the course number (MA316) in the subject line of your email for a faster response.

Required Text: There is no required text for this course, but there will be assigned readings provided on Canvas. You will need graph paper, a ruler, color pencils, and scissors and tape for various tasks.

This class will be conducted in person, on campus, on the days and times listed in the course schedule. Safety measures must be followed as required by the University.

Course Description

This mathematics course will focus on numerical reasoning and problem solving. It is designed around the National Council of Teachers of Mathematics 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 real numbers including integers, fractions, percentages, decimals, rational and irrational 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, and geometric. Students will have mathematics homework as well as out-of-class readings which will require written reflections.

Learning Outcomes

1. Demonstrate a strong conceptual understanding of the properties of numbers (whole numbers, fractions, equivalent fractions, percentages, integers, rational numbers, decimals, irrational numbers, real numbers).
2. Demonstrate a strong conceptual understanding of operations on numbers (whole numbers, fractions, equivalent fractions, percentages, integers, rational numbers, decimals, irrational numbers, real numbers).
3. Demonstrate knowledge of concepts of number and number relationships, number systems, number theory, estimation, and computation in the context of problem solving.
4. Convert between fractions, decimals, and percentages.
5. Compute and estimate fluently using integers, rational numbers, and decimals, including both written and mental strategies.
6. Model and solve a variety of theoretical and applied problems
7. Understand prime and composite numbers, factorization, and common divisors and multiples.

8. Model and solve problems involving ratios, rates, and proportional reasoning, and distinguish between proportional and non-proportional relationships.
9. Use and convert units appropriately when solving problems.
10. **Effectively communicate mathematical ideas orally and in writing.**
11. **Demonstrate a positive disposition, persistence in problem solving, 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 or to answer all questions that will arise as you engage in problem solving. You will at times experience confusion and perhaps frustration which is a natural part of the learning process. I will try to help you work your way out of confusion before your frustration becomes debilitating to your learning. Don't be afraid of wrong answers. 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. Engaging with others in collaborative problem solving will help you see several ways of solving a problem and appreciate a variety of points of view. 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. While getting the right answer is a goal in solving a problem, understanding how you got to the answer and communicating your understanding to others is also important. Collaborative learning is encouraged; however, you are individually accountable for learning the material.

Course Requirements

1. **Attendance and active participation** in all sessions. **Since participation in group tasks is an essential to this course, missing 25% or more of classes will result in a grade of F for this course. Two or more unexcused absences will lower your final grade. Official university policy will be used to determine excused absences.**
2. You may collaborate on the menu tasks. However, it is imperative that you can solve problems on your own on for assessments. A good guideline is that after you have completed a problem/task, you should feel confident that you could 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. Actively participate in classroom discussions or other assigned discussions.
6. Complete an in-class Midterm Performance Task and a Final Performance Task.
7. Develop a final Mathematics Portfolio.
8. Have a positive and productive disposition toward yourself, your classmates, and mathematics. Be respectful of others as you share ideas.

Grading

Students earn their grade in the course as shown in the table below. Points accumulated will be recorded in CANVAS.

NOTE: Since participation is an essential component of this course, missing more than 25% of classes will result in a grade of F for this course.

Rounding policy: Students with good attendance who have submitted all required assignments are eligible to have their final grades rounded up from 0.5.

Assignments	% of Final Grade	Out of 480 total points
Math Menus (2)	22.5	108
Article Reviews	12.5	60
Midterm	22.5	108
Mathematics Portfolio	10	48
Final	25	120
Participation/In-class tasks*	7.5	36

Percent Earned	Final Grade
90-100	A
80-89	B
70-79	C
65-69	D
<65	F

***Participation points are meant to recognize those who put forth a maximum effort and demonstrate persistence in problem solving.** The instructor will use her best professional judgment in awarding points. 7.5% will be awarded to students who:

- have one or fewer absences (and make up the work for any absences)
- actively participate in all group and independent tasks
- demonstrate persistence in pursuing challenging problems and tasks
- show craftsmanship in solving problems and seek to extend their thinking on problems
- show the ability to work independently on tasks
- demonstrate the ability to work effectively with others on tasks
- complete all required tasks on the menus
- give good faith attempts on some of the desserts on the menus

If in the judgment of the instructor a student fails to meet all of the above, the instructor will assign a score between 0 and 7.5% with appropriate credit given for partial successes in meeting course goals. The instructor's decision here is based on her professional experience and is the final judgment on this item.

Time Commitment

You are expected to spend a substantial amount of time working through the course activities and assignments every week. Please know that time management and self-motivation are key components for success in this course and courses in general. Most students who take this course find it beneficial so please keep an open mind. This class meets 2 times per week for 75 minutes each time. In addition to class time, you should spend about 6 hours per week reading, studying, preparing for class discussions, and/or completing assignments and assessments.

Exams

A midterm and a final are scheduled for this class. The midterm will occur during a regular class time and the final will take place at the **regularly scheduled exam time**. Make-up exams will be scheduled only when requested within the first week of the term for a valid and verifiable reason or in case of an extreme emergency.

Working in Groups:

There will be group tasks in which you will collaborate with other students to submit a solution to a task. At the end of some project/tasks, you will be required to fill out a group self-evaluation form to evaluate other team members' contributions to the project.

Attendance and Tardiness/Early Departure Policy

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. **Class roll will be recorded** for each class. **Since participation is an essential component of this course, missing more than 25% of classes will result in a grade of F for this course.** It is your responsibility to talk with your peers regarding what you missed, ask classmates to turn in your assignments, etc. You are responsible for content missed during your absence. Tardiness to class and early departures are disrespectful to the instructor and your classmates.

Late Assignments/Revisions

All assignments are due at the indicated/assigned due date and time in Canvas unless otherwise instructed. In the event the instructor will accept a late assignment, ten percent of the assignment grade will be deducted per day late. No revisions will be possible unless requested by the instructor. If the instructor requests a revision of an assignment, the grade you receive will be an average of the first and second attempts. **Once an assignment closes on Canvas, no late submission will be permitted except in extreme circumstances.**

UAB Policies & Resources

Add/Drop and Course Withdrawal

- **Drop/Add:** Deadlines for adding, dropping, or withdrawing from a course and for paying tuition are published in the [Academic Calendar](#) available online. Review the [Institutional Refund Policy](#) for information on refunds for dropped courses. It is the student's responsibility to initiate add/drop procedures. Students may drop and add courses online after they have registered and until the drop/add deadline online using [BlazerNET](#).
- **Withdrawal:** To avoid academic penalty, a student must withdraw from a course by the withdrawal deadline shown in the academic calendar and receive a grade of W (withdrawn). Failure to attend class does not constitute a formal drop or withdrawal. The official course withdrawal must be completed online in [BlazerNET](#).

Academic Integrity Code

Your success while at UAB and after graduation is valued by the University. To gain and grow in the knowledge and skills needed for your future career, it is vital that you complete your own work in your courses and in your research. The purpose of the [Academic Integrity Code](#) is to support our academic mission and to maintain and promote academic integrity. All students in attendance at UAB are expected to pursue all academic endeavors with integrity, honor, and professionalism and to observe standards of conduct appropriate to a community of scholars. Please be sure you understand the different forms of "academic misconduct" covered by the code. Review [the FAQs about the code](#) for details.

Student Conduct Code

The purpose of the University of Alabama at Birmingham ("University") student conduct process is to support the vision, mission, and shared values of the University and the tenets of the University's creed, The Blazer Way. Through a student-focused and learning-centered lens, the process strives to uphold individual and community standards; foster an environment of personal accountability for decisions; promote personal growth and development of life skills; and care for the well-being, health, safety, and property of all members of the University community.

The [Student Conduct Code](#) ("Code") describes the standards of behavior for all students and student organizations and outlines students' rights and the process for adjudicating alleged violations. It is set forth in writing in order to give general notice of non-academic prohibited conduct. The Code should be read broadly and is not designed to define non-academic conduct in exhaustive terms. All students and student

organizations are expected to conduct themselves in accordance with the Code. The current version of the Code, which may be revised periodically, is available from the Office of Community Standards & Student Accountability.

Intellectual Property

My lectures and course materials, including PowerPoint presentations, quizzes, exams, outlines, and similar materials, are protected by copyright. You may take notes and make copies of course materials for your own use. You may not and may not allow others to reproduce or distribute lecture notes and course materials publicly, whether or not a fee is charged, without my expressed written consent.

DSS Accessibility Statement

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 DSS to discuss accommodations that may be necessary in this course. If you have a disability but have not contacted Disability Support Services, please call (205) **934-4205**, visit [their website](#), or their office located in Hill Student Center Suite 409.

Non-harassment, hostile work/class environment:

The UAB College of Arts and Sciences expects students to treat fellow students, their Course Instructors, other UAB faculty, and staff as adults and with respect. No form of hostile environment or harassment will be tolerated by any student or employee. In this class, we will only use constructive criticism and will work to build a community of life-long learners.

Title IX Statement

UAB is committed to providing an environment that is free from sexual misconduct, which includes gender-based assault, harassment, exploitation, dating and domestic violence, stalking, as well as discrimination based on sex, sexual orientation, gender identity, and gender expression. If you have experienced any of the aforementioned conduct we encourage you to report the incident. For more information about Title IX, policy, reporting, protections, resources and supports, please visit <http://www.uab.edu/titleix> for UAB's Title IX Policy, UAB's Equal Opportunity, AntiHarassment Policy and Duty to Report and Non-Retaliation Policy.

Health and Safety

UAB is very concerned for your continued health and safety. Please consult the Students section of [UAB United](#) for up-to-date guidance because the following information is subject to change as circumstances require.

We strongly urge you to be fully vaccinated. [Here is information on the safety of vaccines and on how to get vaccinated at UAB](#). Mask-wearing has proven to be one of the most successful mitigation strategies used to combat spread of the various variants of the COVID-19 virus. Please check UAB United for mask-wearing requirements and other safety protocols for this semester.

Know the resources available to you to be successful:

[Student Assistance and Support](#) provides individualized assistance to promote student safety and well-being, collaboration and resilience, personal accountability, and self-advocacy. The Care Team consults and collaborates with campus partners to balance the needs of individual students with those of the overall campus community. [The UAB Care Team](#) helps find solutions for students experiencing academic, social, and crisis situations including mental health concerns.

[Disability Support Services](#) assists students with in reaching accommodations for their educational experiences at UAB that ensure that they have equal access to programs, services, and activities at UAB.

The [Vulcan Materials Academic Success Center](#) provides tutoring, supplemental instruction, and other services that encourage goal achievement and degree completion.

[UAB Student Health Services](#) delivers comprehensive, high quality, confidential, primary healthcare to students. Student Health provides testing services and vaccination clinics.

[Student Counseling Services](#) offers students a safe place to discuss and resolve issues that interfere with personal and academic goals. UAB has created a new app (available in the App Store and Google Play) called [B Well](#), that is designed to easily access resources on mobile devices and build a self-care plan. [Kognito](#) is a free, interactive simulation-based platform designed to help you talk with someone when you are worried about your mental health.

[eLearning and Professional Studies](#) provides numerous academic technologies and learning resources for students whose learning may be affected by COVID.

The following are the various websites describing additional student academic and technology resources:

[UAB Policies for Students](#)

[Student Academic and Support Services](#)

[Technology Resources](#)

See also the [Student Assistance & Support](#) website of Student Affairs for a description of Covid-19-related resources, including the laptop loaner program.