MA 514-2D – Geometric & Proportional Reasoning Syllabus
Spring 2021

Instructor: Tami Puchta tpuchta@uab.edu
Class Meetings: Tues./Thurs. 12:30-1:45 University Hall, Rm 1005

Preferred Methods of Contact: Email is the preferred method of contact if you have questions. Please expect a response within 24 hours on weekdays and a slower response on weekends.
I am available to meet with you virtually via Zoom by appointment***. Sign up times will be posted on Canvas*** and will be held in my **Personal Meeting Room on Zoom:** 5447109945

The instructional method for this course is **Hybrid** which includes a mixture of in-person and on-campus instruction and remote learning components. You should be available on the days and hours listed for this class. You will be assigned which days to attend class in person. There will be a significant amount of out-of-classroom learning activities that replace scheduled class meeting time. This course is delivered both in person and via Canvas. **Time Zone:** Central Time Zone

Supplies: There is no required text, but you will need a good compass, a protractor, a ruler, scissors, colored markers or pencils, and a way to organize information provided in class.

Prerequisite: MA 313/513 (Patterns, Functions, and Algebraic Reasoning)

Course Description

This course will continue the methods and inquiry-based learning environment similar to that established in MA 313/513 and is primarily intended for future or practicing elementary and secondary teachers. It will continue to focus on problem solving and making sense out of mathematics. The content focus will be around number systems and number sense, geometry, measurement, and proportional reasoning. Students will develop inductive and deductive reasoning skills and will make and explore conjectures about mathematical concepts. Justification of ideas leading toward formal proof will be developed within the course. Students will experience mathematics through hands-on investigations using manipulatives and appropriate technologies. Collaborative learning will be one of the primary modes of instruction. Students are expected to communicate mathematics verbally and in writing through small group, whole group, and individual interactions.

Course Content

- Analysis of one, two and three dimensional features of real objects
- Identification and classification of geometric figures
- Similarity and congruence
- Position and orientation, and transformational geometry
- Linear, area, and volume measurement including standard and non-standard measurement as well as error analysis
- Ratio and proportionality
- Exploration and analysis of three dimensional objects and their two-dimensional nets
- Mentally and written computation with integers and fractions
- Coordinate graphing
- Number theory (square numbers, triangular numbers, powers, properties of numbers)
- Collecting, organizing, and analyzing data
- Inductive and deductive reasoning
- Mathematically convincing arguments (leading to mathematical proofs)
- Algebraic analysis of one, two and three-dimensional growth patterns

Learning Outcomes

1. Apply inductive and deductive reasoning to problems.
2. Identify properties of geometric figures and apply these in classification schemes and problems.
3. Apply knowledge of properties of a given category of shapes to identify unique figures in a set of shapes.
4. Apply problem-solving strategies to a variety of problems.
5. Find the perimeter, area, and volume of standard (polygonal) and non-standard regions/objects.
6. Apply measurement skills using non-standard measures as well as the metric and English measurement systems.
7. Demonstrate knowledge of concepts of number and number relationships, number systems, number theory, estimation, and computation in the context of problem solving.
8. Apply knowledge of ratio, proportions, similarity, and congruence in solving problems.
9. Apply transformations and the use of symmetry in solving problems.
10. Communicate mathematical ideas orally and in writing including making conjectures and expressing mathematically convincing arguments to justify claims.
11. Demonstrate the ability to interact within groups, and with the class as a whole, while demonstrating cognizance of working with students at different levels
12. Demonstrate a positive disposition toward persistence and reflection in doing mathematics.

One 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. True understanding will come when *you* make sense of a situation. 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 which 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. Sometimes learning occurs by multiple attempts down wrong paths until you find a correct path.

Course requirements

1. **Attendance and active participation in all sessions. Two or more unexcused absences will lower your final grade. Because active group participation is an essential component of this course**, **missing 25% of classes or more with unexcused absences will result in a grade of F for this course.**
2. Complete individual menus of problems, group tasks, and homework problems. If you must miss class, you are expected to complete any missed group work or tasks from the missed class. You may collaborate on solving the menu tasks. However, it is imperative that you are able to solve problems independently on the exam.
3. Complete article reviews and other readings. Full directions and expectations for these assignments will be on Canvas.
4. Complete an in-class Midterm Performance Assessment and a Final Performance Assessment
5. Develop a Mathematics Portfolio. Directions will be provided on Canvas.
6. Complete a long-term task that will be assigned at the beginning of the semester. A portion of this work will be submitted with Menu 2 and the remaining piece will be submitted with your Mathematics Portfolio near the end of the semester.
7. Have a positive and productive disposition toward yourself, your classmates, and mathematics. Be respectful of fellow classmates and the instructor as you share ideas

Evaluation

Students earn their grade in the course as determined in the table below. Points accumulated will be recorded in CANVAS. Important due dates will be listed in CANVAS calendar.

Assignments	Percent of Final Grade	Points
Math Menus (2)	20	96
Participation/Attendance*	10	48
Article Reviews/ Discussion	10	48
Midterm	20	96
Mathematics Portfolio	7.5	36
Group Discussions	10	48
Final	22.5	108

Percent Earned	Grade
90-100	A
80-89	B
70-79	C
64 and below	F

***Since group participation is an essential component of this course, missing more than 25% of classes or Canvas discussions with unexcused absences will result in a grade of F for this course.**

*Item 2 recognizes those who put forth a maximum effort and demonstrate persistence in problem solving. The instructor will use her best professional judgment in awarding the 5% for this item based on a student's full participation in class activities, attempts at completion of challenging tasks, and may be influenced by a student's attempts or non-attempts at dessert items from the menu problems. Five percent will be awarded to students who have one or fewer absences (and make up the work for any absences), actively participate in and complete 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 with others on tasks without providing too much assistance, complete all required tasks on the menus, and 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 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.

Pass/Fail Option – Although P/F is a grading option for this course, it is NOT recommended for those pursuing education degrees and/or teaching certification since a grade of P/F may not be acceptable to the outside organizations that are responsible for teaching certificates (e.g. AL State Department of Education).

Exams

An online midterm and a final are scheduled for this class. The midterm will occur during a regular class time and the final will take place during the scheduled final time for this section. See the Final Schedule here. 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.

Discussions:

You will be assigned to a discussion group each week where you will discuss given tasks to discuss. There are two parts to the discussion – your initial post and your responses.

- Your initial post should show your current thinking about the assigned task. You may submit an incomplete solution, but do show what you have figured out so far.

- You are also expected to respond to at least two posts by other students. Your initial and response posts must be of substance. Posts *only* saying "I agree with your point" or "I did it the same way" are not substantive and will not be counted. Here are some tips on how you can make your post substantive:
    - State how your solution is the same or different than others and how/why.
    - If you are truly stuck, be specific about what you do know (what the is problem asking, what do you know so far) and what kind of help you think you need. NOTE: Simply "getting an answer" that you do not understand will not help you very much in this class.
    - Ask a specific question about someone's solution.
    - Expand on at least one idea shared in the conversation.
    - Connect your solution or someone else's to a previous pattern or task.
    - Ask follow-up questions
    - Answer questions that your peers or instructor ask about your post

Time Commitment:

This is an online course worth 3 credit hours. You should prepare to spend about 9 hours per week on course activities (reading the assigned chapters/articles, watching the videos, participating in the discussions, and completing the assessments). This class meets twice per week for 1.5 hours each. In addition to our virtual class time, you should spend about 6 hours per week preparing for class discussions, participating in group discussions, and completing assignments.

Course Policies

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.

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.

Cell Phones and Other Devices

Let me know in advance if there is an important reason for you to be accessible by phone during class. Please silence your cell phone so you can be fully present to the members of our class and your small groups. Other devices are not permitted in class unless otherwise approved by the instructor.

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 taken** at the beginning of each class period and recorded. Always sign in as documentation of your attendance and punctuality. Tardiness to class and early departures are disrespectful to the instructor and your classmates. It is your responsibility to talk with your peers regarding what you missed, ask classmates to turn in your assignments, etc. You will be held responsible for content during your absence**.**

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.

Early Alert System (EAS) - The EAS is designed to help students be more successful academically at UAB. If you receive an e-mail with EAS in the title, please open it, read it, and take advantage of the support that UAB offers to all students. UAB is committed to ensuring that students receive academic support and that students are aware of the resources available that will assist them in successfully completing their degree program.

Academic Misconduct

The University of Alabama at Birmingham expects all members of its academic community to function according to the highest ethical and professional standards. Students, faculty, and the administration of the institution must be involved to ensure this quality of academic conduct. **Academic dishonesty and misconduct includes, but is not limited to, acts of abetting, cheating, plagiarism, copying homework, fabrication, and misrepresentation**. Review the Academic Honor Code and Non-Academic Student Code of Conduct linked below.

- Academic Honor Code
- Non-Academic Student Code of Conduct

Accessible Learning: 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.

Title IX Statement:
The University of Alabama at Birmingham 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. UAB provides several avenues for reporting. For more information about Title IX, policy, reporting, protections, resources and supports, please visit UAB Title IX webpage for UAB's Title IX, UAB's Equal Opportunity, Anti-Harassment, Duty to Report, and Non-Retaliation policies.

UAB United: Safe Entry to Campus
Please go to the UAB United website for guidance and resources related to our safe entry to campus in Spring 2021, including information on:

- COVID Testing
- Academic resources and in-depth information
- Student Affairs resources to support all students (housing, dining, extracurricular activities, parking, etc.)
- Health and safety resources and recommendations for on and off-campus
- Information for graduate students, School of Medicine students, Post-Docs and International Students

All students should use the Student COVID-19 Entry Checklist to see what they have to do in order to enter the campus safely. Non-compliance with the required items will result in students not being able to remain on campus or participate in any in-person classes, meetings, jobs, extracurricular activities, and events.

Mandatory Masks and Social Distancing Requirements:
In accordance with CDC guidelines and for the health and wellbeing of all faculty, staff and students. Students, faculty and staff are required to wear cloth face coverings or face masks at all times and maintain social distancing (6 feet between individuals in traditional classrooms, or, in instructional laboratories and similar settings) while on the UAB campus. Instructors have the right to ask those who are not complying with these requirements to leave class in the interest of everyone's health and safety. In the event that a student refuses to comply with these requirements, the instructor has the right to cancel class.
Additionally, following other simple practices will promote good health in and out of the classroom, such as frequent and thorough hand washing, wiping down desks and seats with disinfectant wipes whenever possible, not sharing personal items such as pens and cell phones, and avoiding crowded areas and other enclosed spaces.

GuideSafe Event Passport Class Requirement

Faculty are required to verify all students who are present for in-person instruction have a current Event Passport. The COVID-19 pandemic is an extraordinary situation requiring significant measures to create a safe educational community. UAB is using GuideSafe™ Event Passport to facilitate access to classrooms, meetings, events, or facilities having ten or more people. Attendees, including faculty, staff, and students, will complete UAB Healthcheck, a COVID-19 assessment tool, prior to entering their event. An Event Passport is issued based factors from your daily risk level as assigned by the UAB Healthcheck. After you have completed Healthcheck, press the "Passport" button to get your passport. This passport is good for 24 hours. Remember your passport number to access your passport later in the day. Each user is assigned a unique passport number indicating their status for the upcoming event that will show a "Clear" (Green) screen or "Not Clear" (Red) screen. After the 24-hour passport has expired, you will need to complete Healthcheck again. Each passport will have a time and date to ensure validity. Learn more at UAB GuideSafe Event Passport.

Syllabus: This syllabus is subject to changes announced in class and/or on Canvas.