Math 1331: Geometrical Inference/Reasoning
Spring 2018

Instructor: Glenda Mitchell

Office Number: PKH 484

Office Telephone Number: 817-272-0943

Email Address: gmitchel@uta.edu

Office Hours: MWF 11am-1pm; TTh 2:00 – 3:00 pm. Or by appointment

Section Information: MATH 1331-002

Time and Place of Class Meetings: PKH 105 on TTh from 12:30 -1:50 pm

Description of Course Content

This course is designed to prepare future elementary school teachers *mathematically* to teach math (as opposed to *pedagogically,* which is the goal of ECED/BEEP 4311 and EDML 4372). It does this in two main ways: by teaching math which is relevant (not identical) to the math they will be teaching, and by modeling a math classroom through problem-solving activities, cooperative groups, and holding students responsible for deciding (reasoning) what is correct.   Basics of geometry, constructions, polygons, tessellations, polyhedra, symmetry, rigid motion, and measurement are the topics that will be studied.

This course will address three objectives:

- Critical Thinking Skills - to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- Communication Skills - to include effective development, interpretation and expression of ideas through written, oral and visual communication.
- Empirical and Quantitative Skills - to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

Syllabus: An approximate schedule with topics is given below.

Unit Topic	#Hours	Activities
1 Basics	5	Tangram activity Pythagorean Theorem Investigation Applications of Pythagorean Theorem Name that Triangle
2 Constructions	4	Exploring Constructions Circle Constructions Constructing Numbers
3 Polygons	6	Regular Polygons Constructible Polygons I

		Constructible Polygons II Vertex Angles Regular Septagon
4 Tessellations	5	Tessellations of a Plane Vertex Figures and Arrangements
Midterm	**1**	**March 8**
5 Polyhedra	6	Regular Polyhedra Nonregular Polyhedra Platonic Solids Euler's Formula Extending Polygons
6 Symmetry	6	Symmetry of Planar Objects Symmetry of 4D Objects Extending Euler Composing Symmetries of a Square
7 Rigid Motion	4	Rigid Motions Translations Rotations Reflections Equivalent Rigid Motions Three Reflections
8 Measurement	3	Need for Standard Units Perimeter Area Area Formula Surface Area: "Toy Blocks" Volume: Eureka?
Review	1	

Final exam: Thursday, May 10 from 11:00 – 1:30pm
Last day for automatic withdrawal: March 30
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.

Student Learning Outcomes

There will be almost no lecturing in this course. To help you develop your intuitive reasoning and problem-solving skills, we will spend most of our class time working in small groups on problems from the course packet. An important part of learning to solve problems is being willing to struggle with a problem even after you get stuck, and this is one of the first things you will face this term. You may be surprised by how much you can do if you just keep at it! We will usually discuss the problems in a large group after most groups have finished them. Sometimes you will be asked to write up your ideas and solutions, but always you are expected to think about the problems, participate in solving them, and communicate your ideas with others. Communicating your ideas clearly to others is as important as developing them in the first place. Note that this is a math *content* course, and not a pedagogy course. We hope that taking this course will help you be a better teacher, but more by setting an example rather than teaching you math methods. Students who come out of this course generally feel a lot more comfortable about teaching math, and about being a mathematical authority in the classroom. Hang in there!

After completing this course, the student should be able to:

- communicate clear mathematical claims and justifications orally and in writing

- use concrete, pictorial, and symbolic models to explain and justify the Pythagorean Theorem

- calculate vertex angle measures for regular polygons, and explain and justify a general procedure for doing so

- demonstrate and justify tessellations of the plane using an arbitrary triangle or quadrilateral

- provide and justify the exhaustive classification of regular and semiregular tessellations of the plane, and regular polyhedra

- analyze symmetries of planar and solid figures using pictorial and concrete models, respectively

- explain the relationships between perimeter and area of planar figures, and between surface area and volume of solid figures

- explain and justify common formulae for area and volume of geometric figures, using concrete, pictorial, and symbolic representations

- determine, and describe general procedures for determining, areas and volumes of irregular figures, using concrete, pictorial, and symbolic representations

Requirements
Completed College Algebra

Required Textbooks and Other Course Materials
Purchase the Coursepack at UTA Bookstore or download it from BB in Course Materials. You will also need scissors, straightedge, compass, pipe cleaners, protractor, and colored pencils.

Descriptions of major assignments and examinations

The **exams** will be similar in nature to the problems we work in class, but short enough to be completed in the time given. A sample exam will be distributed before each exam in order to give you a closer feel for it, though you should *not* expect it to serve as an exact blueprint for the real thing. The dates and times for the midterm and final exam (both in our usual room) are given above. Please mark them on your calendar now so as to avoid conflicts. If a conflict arises, *please* see me as soon as possible to resolve it. No make-up exams will be given without prior arrangement.

Write-ups

THE WRITTEN WORK will have two components: write-ups (also called problem reports) and 'reflections" in the form of discussions, journals, and wikis. A write-up is a detailed solution to a problem we discussed in class. These write-ups should be readable independently of any worksheet on which they are based, in good English and either legibly handwritten in ink or word-processed. They should always include the following (although you need not use this form): 1. a statement of the problem at hand, 2. any strategies you used to attack the problem, 3. the solution you obtained, with an explanation of how you got it (and how you know it is complete), and 4. a conclusion that says what we can take with us from the problem. Communication of what you understand (even if it's not a complete understanding) is at least as much the point as finding the solution. The write-ups can be uploaded into Blackboard under "Writeups".

Discussions

I will also sometimes ask you to write a reflection on a rather less concrete issue, like "What does it mean to get stuck?" These will be completed on Blackboard in discussion for all reflections, more on how much thought went into it than on organization and content.

Journals & Wikis

The journals and wikis will be opportunities to practice the concepts investigated in the groups during class time. Use these activities to practice the mathematical ideas, communicate the ideas, and prepare for the tests.

I will let you know at the time I assign written work when it is due, but typically it will be due in class a week from the time it is assigned. You will have roughly one assignment due per week. Each student is allowed **one late submission per semester**, but all written work must he turned in before the same assignment is handed back to the rest of the class, to receive credit. Late submissions after the first week will be accepted at the discretion of the instructor, with penalties. At the end of the semester, each student will have the opportunity to rewrite one assignment. If you find you are having difficulty with written assignments, I encourage you to consult me, one or the other 1330 instructors, or your classmates, bringing a draft of the paper to go over. Small groups whose members revise each other's drafts historically tend to do better on them.

Assignments: The exact due dates will be assigned during the semester. There is usually one assignment a week excluding the week of the midterm.

These are *your* blackboards. Own the classroom.

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, **ATTENDANCE AND PARTICIPATION** are a significant part of your grade because this course is more an experience than a set of material to be learned. Most of what I hope will happen for you in this course will take place inside the classroom, working in groups and talking with others.

Attendance will be taken by means of a daily sign-in in Blackboard. I have established the following attendance policy that you may miss up to 2 days (**excused or not**) without penalty; after that your participation grade will drop approximately 2 ½ points for each class missed over the 2 days. Arriving late (after we have started class) or leaving early counts as half an absence. There will be a sign-in sheet if you are later than 15 minutes or more from the start of class. You could miss important announcements, often made at the beginning or end of class. Students with special needs, or other situation which affects their attendance for several consecutive classes, should consult with the instructor as soon as possible. It is also in your interest to participate in the group problem solving sessions since active learning is better than passive learning. Participation includes both small and large group work. Participation in small groups means coming to class prepared (working on a problem outside of class, or bringing requested materials to class), working productively with groupmates, and making sure everyone in your small group follows what you are doing, Large group participation means making some sort of tangible contribution. If you don't feel comfortable answering questions, *ask* one of your own, questions spur discussion as much as answers, and you'll be doing a favor to classmates wondering the same thing.

Grading

Students are expected to keep track of their performance throughout the semester on Blackboard and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels. Your grade for the course will be determined:

Class Average	Percent of Grade
Write-ups	28%
Discussions, Journals, & Wikis	22%
Participation & Attendance	10%
Midterm Exam	20%
Comprehensive Final Exam	20%
Total:	100%

Make-up Exams
Please mark them on your calendar now so as to avoid conflicts. If a conflict arises, *please* see me as soon as possible to resolve it. No make-up exams will be given without prior arrangement.

Resources

If you're having trouble with a problem or a topic there are several places you can go to talk about it:

- To the other students in the class; often you can figure things out together that you didn't understand on your own. I highly suggest that you form study groups and start doing reviewing activities done in class and suggested practice together right from the start of the semester.

- To me, came and see me during office hours or arrange another time. Or email me with your question.

Professionalism is expected

You are expected to attend all class meetings, be curious, ask questions, seek opportunities to learn, and be open and responsive to feedback. In addition:

- Display a positive attitude

- Be a team player- mathematics need not be a competitive sport

- Be an active participant- mathematics should not be a spectator sport

- Attend daily, be punctual

- Be committed, take your work seriously

- Work diligently on reviewing and understanding class activities and suggested practice

- Improve yourself as a mathematician

- Help others – if you know the mathematics being discussed, practice your mentoring skills

- Complete all assignments to the best of your ability

- Celebrate your colleagues' learning

- Be patient with yourself

- Review the individual feedback on write-ups to give yourself opportunities to improve understanding

Expectations for Out-of-Class Study
Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 8 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

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/ses/fao).

Accommodations and Americans with Disabilities Act

UT 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), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* 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 disability. Students are responsible for providing the instructor with official notification in the form of **a letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability. Counseling and Psychological Services (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Grade Grievances

Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. For undergraduate courses including this one, see http://catalog.uta.edu/academicregulations/grades/#undergraduatetext. For student complaints, see http://www.uta.edu/deanofstudents/student-complaints/index.php.

Non-Discrimination Policy

The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.

Title IX

The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Academic Integrity

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. This course includes a zero tolerance policy for academic dishonesty and students 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 in their courses by 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. Additional information is available at https://www.uta.edu/conduct/. **Students found guilty of cheating may receive a grade of "F" for the course.**

"Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Series 50101, Section 2.2)

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 http://www.uta.edu/universitycollege/resources/index.php.

University Tutorial & Supplemental Instruction (Ransom Hall 205): UTSI offers a variety of academic support services for undergraduate students, including: 60 minute one-on-one tutoring sessions, Start Strong Freshman tutoring program, and Supplemental Instruction. Office hours are Monday-Friday 8:00am-5:00pm. For more information visit www.uta.edu/utsi or call 817-272-2617.

The Library's 2nd floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation. http://library.uta.edu/academic-plaza.

The IDEAS Center (2nd Floor of Central Library) offers free tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817) 272-6593.

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.

Campus Carry

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns

is not allowed on college campuses. For more information, visit
http://www.uta.edu/news/info/campus-carry/

Student Feedback Survey

At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are 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 via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit http://www.uta.edu/sfs.

Final Review Week

For semester-long courses**,** 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. 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.

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. We further recommend that you enter the UTA Police Department's emergency phone number into your own mobile phone. For non-emergencies, contact the UTA PD at 817-272-3381.

Student Intellectual Property Rights Statement

A student shall retain all rights to work created as part of instruction or using university technology resources.