

University of North Texas at Dallas
Fall 2015
SYLLABUS

| MATH 4060 (Foundations of Geometry) (3Hrs) | |
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| Department of | Mathematics and Information Sciences |
| School of | Liberal Arts and Sciences |
| Instructor Name | Dr. Ali Shaqlaih |
| Office Phone | 972-338-1569 |
| Email Address | ali.shaqlaih@untDallas.edu |
| Office Hours | Founders' Hall 227: MTWR:8:30-9:50am |
| Classroom Location & Meeting Times | DAL2-242: TR: 10:00-11:20 am |
| Course Catalog Description | Geometry is the first branch of Mathematics that humans managed to systematize and place on a rigorous footing. It is the foundation for our mathematical interpretation of the world. In this course, We will study a systematic development of geometry from an axiomatic point of view. We will be exploring the fundamentals of geometry, beginning with axioms and proceeding from there. We will also be looking at the logical structure of theorems and proofs. We will study the fundamentals of Euclidean Geometry, Hyperbolic Geometry, Spherical Geometry and other non- Euclidean Geometry topics as time permits. |
| Prerequisites: | Math 3000 and prior or current enrollment in Math 3510. In addition, you should be proficient at writing basic proofs, a skill that you will enhance throughout this course. |
| Required Text: | <ul style="list-style-type: none"> • Gerard A. Venema (2012), <i>Foundations of Geometry</i>, 2nd edition, second printing, Prentice Hall. ISBN: 0136020585. • Class notes and all the handouts distributed by the instructor in this class are as important as the textbook. |
| Recommended Text and References: | <ul style="list-style-type: none"> • Marvin Jay Greenberg (2008), <i>Euclidean and Non-Euclidean Geometries: Development and History</i>. Publisher: W. H. Freeman and Company, 4th edition. ISBN: 0716799480. • David C. Kay: Addison Wesley Longman (2001), <i>College Geometry: A Discovery Approach</i>. ISBN: 0-321-04624-2 |
| Access to Learning Resources: | UNT Dallas Library: phone: (972) 780-3625; web: http://www.unt.edu/unt-dallas/library.htm UNT Dallas Bookstore: phone: (972) 780-3652; e-mail: 1012mgr@fheg.follett.com |
| Course Goals | |
| | The goal of this course is to: <ul style="list-style-type: none"> • Understand axiomatic systems. • Strengthen ability to construct sound mathematical arguments. |

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| | <ul style="list-style-type: none"> • Learn about important issues in the history of geometry. • Improve geometric intuition. • Improve oral and written communication skills in Mathematics. • Improve problem solving skills. • Help the student develop the skills of logical reasoning and careful presentation of proof. |
| Learning Objectives/Outcomes: | |
| | <p>Course Objectives: At the end of this course, the student will be able to:</p> <ul style="list-style-type: none"> • Describe the difference between Euclid's approach and Hilbert's approach. • Describe some models of non-Euclidean geometries. • Write rigid mathematical proofs. • Explain important concepts in geometry. <p>○ Program Learning Outcomes: In this course, the student will be able to:</p> <ul style="list-style-type: none"> • Formulate conjectures by considering examples that move from the specific to general • Use a variety of techniques-such as mathematical induction, proof by contradiction, or direct application to axioms, and previously proven theorems- to prove propositions. |

Course Outline

Priority will be given to understanding the material in depth rather than covering more topics.

This schedule is subject to change by the instructor. Any changes to this schedule will be announced in class.

| TOPICS | TIMELINE |
|--|-----------|
| Euclid's Elements, Axiomatic Systems, Incidence Geometry | August |
| Plane Geometry, Neutral Geometry | September |
| Euclidean Geometry, Area, Circles | October |
| Constructions, Hyperbolic Geometry | November |
| Spherical Geometry | December |

Grading Matrix:

| Instrument | Value | Total |
|------------|-----------------------------------|-------|
| Quizzes | 4 quizzes at 25 points each | 100 |
| Hour Exams | 2 exams at 150 points each | 300 |
| Portfolio | 4 checks points at 25 points each | 100 |
| Project | Group project | 100 |
| Attendance | Attendance & Participation | 50 |
| Final Exam | A comprehensive exam | 350 |
| Total | | 1000 |

The following standard grading scale will be used to determine your final letter grade:

$100\% \geq A \geq 90\% > B \geq 80\% > C \geq 70\% > D \geq 60\% > F \geq 0.$

Technology Use Policy:

We will be using the geometries sketchpad and Geo-Gebra to explore advanced Euclidian geometry. I will make sketchpad available in the math lab so students can use it. In the class we will talk a little about the software and its use as time permits. It is important for the students to master the use of this program to be able to visualize some geometric concepts.

Portfolio Policy:

This is an outside of class work; you will carefully write a final version of the solution of each of the assigned problems and compile these in a single loose leaf notebook which you will biweekly turn in to me to review. You should keep your portfolio up to date. I will ask for the portfolio to be submitted on regular basis (**no previous notice will be given**). Use of complete, correct English logical sentences is essential. All portfolio problems should be written in appropriate way and all work must be shown in details. Homework is essential for your full understanding of the course material. The assigned homework problems are the minimum number of problems required to attain some level of mastery of the material and you should work more problems to achieve full mastery of the material. You should do all homework problems but only selected problems will be graded. Make sure, to say exactly what you mean and to mean what you say. You will be able to make revisions to your portfolio as necessary, but in the end all problems must all be correct. Please be as neat as possible on the portfolio and try to keep the problems in order with enough space between them (it will be a good idea to put each problem in one page). Math gets harder the more unorganized you work! Portfolio will be collected without prior notice to be graded so you need to be ready and up to date. Portfolio grade includes the written part, participation, presentations and activities in class.

Quizzes policy:

There will be 5 quizzes throughout the course. At the end of the semester, each student's best four quizzes will be added to get a 100 possible-point total. The quizzes will be given in the first 15 minutes of the class. There will be no make-ups for missed quizzes for any reason. The material that will be covered in the quizzes will be announced a head of time.

Exams Policy:

Exams should be taken as scheduled in the class time. All exams are closed book exams. No makeup examinations will be allowed except for documented emergencies (See Student Handbook). The material that will be covered in the exams will be announced in class and the final exam will be comprehensive.

Make-up exam policy:

All requests for make-up exams **MUST** be submitted to the instructor in writing, with the supported documents. It is imperative that you contact your instructor as soon as possible (do **NOT** wait until you return to class!) and include a way that you can be reached.

Presentation policy:

You will be asked to take turns presenting and explaining your proofs at the board in front of the class. You should try to present as many times as you can and to present the material as clear as you can.

Attendance and Participation Policy:

The University attendance policy is in effect for this course. Class attendance and participation is expected because the class is designed as a shared learning experience and because essential information not in the textbook will be discussed in class. The dynamic and intensive nature of this course makes it impossible for students to make-up or to receive credit for missed classes. Attendance and participation in all class meetings is essential to the integration of course material and your ability to demonstrate proficiency. Coming to class late or leaving it early is considered an absence. Students are responsible to notify the instructor if they are missing class and for what reason. Students are also responsible to make up any work covered in class. It is recommended that each student coordinate with a student colleague to obtain a copy of the class notes, if they are absent. Learning is both more effective and more satisfying when you can be an active participant in the process. In this course students will spend a substantial part of the class time presenting their own work in class. You should plan to come to all classes prepared to do this.

General Policies:

- The first and most fundamental expectation I have for everyone in the class is to respect one another. Among other things, this means that only one person speaks at a time, **no one works on anything not related to the class (no cell use, no texting, no reading, no sleeping,...) and** everyone will put forth an honest effort.
- It is the student's responsibility to stay abreast of all class announcements and changes made to this syllabus in class, whether present or not.
- Leaving and entering the class back is generally **not allowed**. You can leave the class if you are not returning or for real emergency case. Leaving the class should be by the permission of the instructor.
- You are expected to review all graded quizzes, homework and exam papers as soon as they are returned. All questions about the grading of quizzes, homework or exam papers must be reported within **seven** calendar days of the date on which the paper was returned.
- You will **NOT** get better than a grade of C if you miss **more than 5 classes**. Missing more than 5 classes may result in being dropped from the course with a WF.
- To do well in this course, attend class every meeting on time, be prepared to work for the full class time, bring all necessary materials to class, participate as much as possible, do the homework and extra problems steadily every day rather than once a week. Don't be afraid to make mistakes or ask questions, the more you get involved, the better you'll do!
- **My door will always be open and you should feel free to e-mail me if you have questions.** Don't stress out about math! You have the abilities to do very well as long as you work hard.

Students with Disabilities (ADA Compliance):

The University of North Texas Dallas faculty is committed to complying with the Americans with Disabilities Act (ADA). Students' with documented disabilities are responsible for informing faculty of their needs for reasonable accommodations and providing written authorized documentation. For more information, you may visit the Office of Disability Accommodation/Student Development Office, Suite 115 or call Laura Smith at 972-780-3632.

Student Evaluation of Teaching Effectiveness Policy:

The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider the SETE to be an important part of your participation in this class.

Bad Weather Policy:

On those days that present severe weather and driving conditions, a decision may be made to close the campus. In case of inclement weather, call UNT Dallas Campuses main voicemail number (972) 780-3600 or search postings on the campus website www.unt.edu/dallas. Students are encouraged to update their Eagle Alert contact information, so they will receive this information automatically.

Attendance and Participation Policy:

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Academic Integrity:

Academic integrity is a hallmark of higher education. You are expected to abide by the University's code of Academic Integrity policy. Any person suspected of academic dishonesty (i.e., cheating or plagiarism) will be handled in accordance with the University's policies and procedures. Refer to the Student Code of Academic Integrity at http://www.unt.edu/unt-dallas/policies/Chapter%2007%20Student%20Affairs,%20Education,%20and%20Funding/7.002%20Code%20of%20Academic_Integrity.pdf for complete provisions of this code.

In addition, all academic work submitted for this class, including exams, papers, and written assignments should include the following statement:

On my honor, I have not given, nor received, nor witnessed any unauthorized assistance that violates the UNTD Academic Integrity Policy.

Copyright Policy:

The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this course, which include but are not limited to syllabi, lecture notes, quizzes, exams, in-class materials, review sheets, projects, and problems sets. Because these materials are copyrighted, you do not have the right to copy and distribute the handouts, unless I expressly grant permission.

Classroom Etiquette:

Appropriate behavior is expected of all students taking this course.

- Arrive to class promptly and do not leave until the scheduled ending time of the class.
- If you must arrive late or leave early, please do so as discreetly as possible and take a seat near the door.
- Turn off all non-medical electronic devices such as pagers, cell phones, laptops, etc. Take off the headphones.
- Do not read newspaper or work on unrelated assignments during class.

Grade Assignment:

- The student course grade is assigned according to the evaluation criteria and grading assignment stated on this syllabus.
 - The grade is completely objective and is determined solely by student performance on each of the evaluation criteria (in-term exams, in-class quizzes, on-line quizzes, and the final exam).
 - **Do not expect extra credit work or bonus grade assignments.**

Student Behavior:

- Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT.
- Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Student Life Center to consider whether the student's conduct violated the Code of Student Conduct.
- The university's expectations for student conduct apply to all instructional forums, including university and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at http://dallas.unt.edu/sites/default/files/page_level2/pdf/policy/7.001%20Code%20of%20Student%20Rights%20Responsibilities%20and%20Conduct.pdf

Diversity/Tolerance Policy:

Students are encouraged to contribute their perspectives and insights to class discussions. However, offensive & inappropriate language (swearing) and remarks offensive to others of particular nationalities, ethnic groups, sexual preferences, religious groups, genders, or other ascribed statuses will not be tolerated. Disruptions which violate the Code of Student Conduct will be referred to the Center for Student Rights and Responsibilities as the instructor deems appropriate.

Portfolio Assignments

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| 1.6: 4, 6, 7 2.4: 2, 4, 8 2.5: 2, 10, 11 2.6: 2, 3 |
| 3.2: 1, 2, 5, 7, 8, 23 3.3: 1, 2, 3.4: 1 3.5: 2, 4, 5 3.6: 2 |
| 4.1: 1 4.2: 1, 4 4.3: 1, 5, 6 4.4: 1,2 4.7: 1, 2, 6 |
| 5.1: 1, 3, 4 5.3: 1, 2 5.4: 3, 5.5: 1, 2, 3 5.6: 2, 4, 17 |
| 7.1: 1 7.2: 1, 8 |
| 8.1:1,3 8.3: 1, 6 8.5: 7 |

Important dates:

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| Quiz 1 | Sep.3 |
| Portfolio check point #1 | Sep. 10 |
| Quiz 2 | Sep.17 |
| Portfolio check point #2 | Sep.24 |
| Quiz 3 | Oct. 1 |
| First Hour Exam & Portfolio check point # 3 | Oct. 8 |
| Quiz 4 | Oct.15 |
| Portfolio check point # 4 | Oct.22 |
| Quiz 5 | Oct.29 |
| Portfolio check point # 5 | Nov. 5 |
| Quiz 6 | Nov. 12 |
| Second hour exam & Portfolio check point # 6 | Nov. 19 |
| Project presentations | Dec. 3 |
| Final exam | Dec. 10 at 10:00 am |