

MATH 439 Euclidean and Non-Euclidean Geometry

Fall 2018

Historical Note:

After 1542, candidates for the Master of Arts degree at the University of Paris had to take an oath that they had read the first 6 books of the Elements

Pre-Requisite: Math 307

Time: MWF 11.00 – 11:50 am

Place: M 306

Instructor: Dr. Sriraman

Office: Math 310

Office Hours: MW: 9.00-9.45 am

Phone & E-mail: 243-6714; sriramanb@mso.umt.edu

Texts: Thirteen Books of Euclid's Elements. Text is provided free as a pdf file.

What are The Elements?

Some Definitions, 5 Common notions and 5 Postulates to deduce an orderly chain of 467 theorems!

Other Material: Compass, protractor and straightedge. Geometer's Sketchpad.

Learning Outcomes: Upon completion of this course, a student will be able to:

- *Construct mathematical proofs using the axioms of Euclidean geometry;*
- *Explore, conjecture, and prove mathematical ideas and theorems;*
- *Develop a facility with geometric theorems and proofs, through hands-on exploration;*
- *Explain different geometries and their development, through comparisons of their axioms, and the validity of basic theorems in different geometries.*

To further the learning outcomes this is the course agenda:

Agenda: We will survey different geometries with a firm basis in axiomatic Euclidean geometry.

The following topics will be covered

Geometry Explorations/Constructions using Sketchpad

Geometry and Numbers

Axiomatic Euclidean Geometry

Various Non-Euclidean Geometries particularly

- Spherical Geometry

- Fractal Geometry [time permitting]

Academic Misconduct: Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. Academic misconduct is defined as all forms of academic dishonesty and the Student Conduct Code. In particular, Student Conduct Code Section IV.a.5 identifies the following violations: Submitting false information: Knowingly submitting false, altered, or invented information, data, quotations, citations, or documentation in connection with an academic exercise.

DISABILITY MODIFICATIONS: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

ADD / DROP POLICIES: The last day to add/drop a course, change sections, or change grading option (between letter grade, Credit / No Credit, Audit) is October 29, 2018. From October 29 and until December 7, 2018 these changes are allowed to be done only by Petition, which requires the signature and approval by the professor. In case of drops only, the petition also requires signature of the Dean of the student's major. **The final deadline for all changes is December 7, 2018.**

Acceptable reasons for a late drop are listed in the university catalog and include reasons such as accident, illness, family emergency or a change in work schedule. The following examples are not considered sufficient for a late drop: protecting GPA, forgetting to turn in the change slip, losing financial aid, losing eligibility to engage in sports.

Grading Distribution:

Project Folder	70
One Book from the Elements	50
Mid-term	120
Final Exam	160

400 points

Grading Scale: 90-100 A ; 80-89.9 B ; 70-79.9 C ; 60-69.9 D ; Below 60 F

Exam make-ups will ONLY be given under special and extenuating circumstances, such as a death in the family or illness, provided that: a note from the Health Service or doctor is furnished by the student AND permission is obtained from the instructor. The final exam is compulsory and no exceptions can be made about the date/time at which it is held- this date is determined by the University Administration.

Endnotes

Investigations Folder: I will assign "interesting" investigations periodically over the course of the semester [which will be posted on Moodle]. Instructions for completing these will be found there as well. The folder will be collected before Thanksgiving.

One Book from the Elements: I will assign one of the Books of the Elements to a pair of students to study and present to the Class.

Mid-terms and Final

The midterm will be given in November. The final will be cumulative in the traditional sense. It will be longer than the mid-term exam and will feature some questions relating directly to material taught earlier in the course.

The Final exam is scheduled from 8-10 on December 14th in M306.. The date and time of the Final cannot be changed for any reason.

"FREE" ADVICE

Come to class, work hard, participate in the planned activities, and you will do well in this course.