

# BETHEL COLLEGE

## MATH531 Euclidean and Non-Euclidean Geometry Spring 2019

INSTRUCTOR:	Dr. Alice A. Ramos
OFFICE:	S 011
PHONE:	574.807.7054
OFFICE HOURS:	TBA
EMAIL:	alice.ramos@bethelcollege.edu
CLASS MEETINGS:	T 6:00-8:50 P.M., Room TBD; FACE TO FACE CLASS
DATES:	1/9-4/27/19

### Course Description

A course (specifically geared toward educators) exploring Euclidean and non-Euclidean geometries through a combination of hands-on activities and logical development. Topics include: axiomatic systems (and their philosophical implications), historical development of Euclidean and non-Euclidean geometries, fractals and fractional dimension.

### Prerequisite

Graduate standing or permission of instructor; an undergraduate level proofs course is recommended but not required.

### Required Resources

**Primary Text:** *Exploring Geometry*, by David Henderson and Daina Taimina, Pearson Prentice Hall, 2005, ISBN 0-13-143748-8.

**Online Resources:** Students are expected to check Canvas, and Bethel e-mail regularly for course and school related communications. Course resources (syllabus, assignments, projects, etc.) will generally be made available through Canvas.

**Software:** This course will utilize two programs for exploring geometries and geometric relationships: *Geometer's Sketchpad* available on campus computers, and *Geogebra*, freeware available online at [www.geogebra.org/cms](http://www.geogebra.org/cms).

**Supplies:** reliable compass and protractor, flexible ruler, colored pencils, pens, ball (such as a worn tennis ball) and rubber bands

### Course Objectives

After you complete this course, you should be able to:

1. Consider math as a creative process born from several historical strands;
2. Develop hands-on activities for exploring aspects of geometry;
3. Construct more clear, effective, and precise mathematical proofs;
4. Generally communicate mathematical ideas and information more clearly, effectively, and precisely through both oral and written means; and
5. Exhibit proficiency in both conceptual understanding and techniques for the content outlined in the course description.

## Attendance Policy

Excellent attendance is *expected* and will be crucial to your success in the course, as our work will be largely discussion based. Please contact the instructor (via email) prior to any foreseen absence. Generally, in-class activities cannot be made up and due dates for out-of-class assignments will not be adjusted due to absence. In extenuating circumstances, exceptions may be made at the discretion of the instructor. In the event of an absence, it is the responsibility of the student to find out about missed material, announcements etc.

## Course Grades

Your grade will be based on writing assignments (40%), four quizzes (15%), reading assignments and participation (15%), a final presentation (15%), final exam (15%). The grading scale is as follows:

A	93–100	B-	80–82.9	D+	67–69.9
A-	90–92.9	C+	77–79.9	D	62–66.9
B+	87–89.9	C	73–76.9	D-	60–61.9
B	83–86.9	C-	70–72.9	F	0–59.9

## Reading Assignments and Participation

Reading Assignments will be given prior to each class meeting. It is your responsibility to prepare for the next class period by reading, taking notes, and taking a preliminary stab at answering the questions within the reading. When you come to class, you will be expected to be able to draw from these notes to add to class discussions.

Keep a journal to record your notes from reading, your notes from classroom discussions, and any further notes generated by the topics covered in class. I will collect and review these journals (notebooks or binders) during exams for part of your reading and participation grade.

## Writing Assignments

Writing assignments will be given pertaining to material covered in class. You will generally have about a week to develop a rough draft (typed). I will review your rough draft and make comments. You will have another week to revise your draft and resubmit. Developing solutions will be given an opportunity for a third draft, at the discretion of the instructor. Your grade will be based on three factors: completeness, correctness, and clarity of explanation. You should explore each question and write out your thinking in a way that can be shared with others. Focus on your own ideas and understandings, and turn in whatever your thinking is on a question, even if only to say, "I do not understand such and such" or "I am stuck here." Be as specific as possible. Propose ideas. Use pictures. Respond to my comments and questions. Some assignments may include a combination of written responses and applications of Geometer's Sketchpad and/or Geogebra.

Correct use of mathematical symbols, logic, and language is expected. There are frequently several different ways to (correctly) explain a concept, solve a problem, or construct a proof. Whatever method you use, be sure that it follows logically and demonstrates your reasoning. A central aim of this course is to develop in the formulation of mathematical questions and logical development. You therefore should NEVER consult any reference materials outside of the course texts in answering questions for this course. This includes materials found on the internet. The ideas that you present should be your own.

The best approach is to strive for a solid understanding of the course topics and to accept at the start that this necessarily entails some struggling with ideas and possible frustration. The course problems take time, especially time to explore and think about the ideas. Often you may need to walk away for a while or for a day, and return to a problem for a second or third look before writing up your response.

## **Quizzes**

There will be approximately four quizzes and a final exam. These quizzes are spaced about three weeks apart and will allow me the opportunity to gauge your understanding of recent topics. The final exam is scheduled for Tuesday, May 1st, 10:30 A.M.-12:30 P.M.

## **Final Presentation**

Details of this project will be provided mid-term.

## **Course Content**

We intend to cover most of chapters 1-10, and other topics as time allows.

## **Cheating/Plagiarism**

“Any act of deceit, falsehood or stealing by unethically copying or using someone else’s work in an academic situation is strictly prohibited.

1. A student found guilty of plagiarism or cheating will receive an “F” (zero) for that particular paper, assignment or exam. Should this occur, the professor will have an interview with the student and will submit a written report of the incident to the academic dean.
2. If a second offense should occur, the student will be asked to appear before the professor, the academic dean and the vice president for student development. The student should realize that at this point continuation in a course and even his/her academic career may be in jeopardy. In the event of a recommendation for dismissal, the matter shall be referred to the Student Development Committee.” (Bethel Student Handbook, page 156)

## **Cell Phone Policy**

Please be sure that cell phones are completely silenced or turned off and stowed out of sight at the beginning of class each day to help minimize class interruptions. Any student using a cell phone (without permission) will be asked to leave the class and an unexcused absence will be recorded. Students using cell phones during graded activities (e.g. exams, quizzes, etc.) may be cited for cheating (at the professor’s discretion).

In the case of expected emergencies, students may seek permission from the professor to leave their cell phones on during class, but the phone must remain stowed out of sight. Professors reserve the right to have operational cell phones in class.

## **Students with Disabilities Policy**

In accordance with the provision of the Americans with Disabilities Act, if you require any special assistance or adaptations in this course, please contact the professor immediately.

Students with disabilities are requested to contact the Office of Academic Support in the Life Calling and Student Enrichment Center to complete the intake process and determine their eligibility for reasonable accommodations. These arrangements should be made well in advance of the first course exam.

## **Disclaimer**

This syllabus is not a legal contract, but serves as a general outline for the semester. The professor reserves the right to make adjustments to the course as the need arises.

*Forward, with Christ at the helm!*

*Study to show thyself approved unto God, a workman that needeth not to be ashamed, rightly dividing the word of truth.*

— 2 Timothy 2:15 KJV