

# Geometry

MA495 Winter 2018: Northern Michigan University

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## Math 495 :: Syllabus :: Winter 2018

This is the [syllabus](#) for Geometry Math 495. Here you'll find information on prerequisites, grading policy, [homework](#), study [resources](#) and a tentative course [schedule](#).

### Classroom

Class will be held, unless otherwise noted, at the following days & times.

- Math 495 :: JAMR 3311 :: 1:00 - 1:50 pm :: MWF

Your daily attendance is required. You are expected to come to class daily, to be fully awake, to pay attention to and participate in the class discussion. I will do my part to make class something you look forward to rather than dread.

### Prerequisites

You need either:

- C or better in MA211

### Course Webpage

- <http://euclid.nmu.edu/~joshthom/Teaching/MA495>

### Textbooks

- *Euclidean & Non-Euclidean Geometries* by Marvin Jay Greenberg

### Office Hours

I am often in my office **JXJ 2226**, just stop by or call and see if I am available, or email me to make an appointment. My official office hours are :

- Monday: 2pm - 3pm
- Tuesday: 1pm - 3pm
- Wednesday: 2pm - 3pm
- Friday: 2pm - 3pm

## Grading

The percentages of your final grade will be as follows

- Homework - 35%
- Exams - 40%
- Final Project - 25%

## Homework

In most of the homework you will be writing proofs. As in any higher-level mathematics class, your proofs should be written in complete sentences. The goal of the proof should be to explain not to verify. Pictures and diagrams are encouraged. A selection of problems will be graded. If a problem is to be graded, it will be graded as follows.

- 0 - left blank
- 3 - question copied, nothing else written
- 4 - something written apart from the question, but it appears to be written only to take up space
- 6 - substantially incomplete; does not really answer the main question; major errors; poor writing
- 8 - mostly complete; maybe a few minor errors
- 9 - complete; no errors; some personal insight; well-written
- 10 - wonderful

You are welcome to work with your classmates on problem sets but your final writeup must be your own. Do not look up solutions to the problem in any written form, including the internet. You are encouraged to ask me questions about the problem sets.

## Exams

The examinations will be in class during our usual time. The exams will be closed book, closed notes, closed friends and open-brained.

- Exam 1: February 23
- Exam 2: April 13

## Final Project

In lieu of a final exam, you will complete a final project. A list of topics will be distributed in February. The end of each chapter of the text lists some ideas or you may suggest your own.

- Part I: 6-10 page paper
- Part II: 10-15 minute presentation on your topic (poster or slideshow is recommended)
- You can work alone or in pairs.
- You may talk to anyone about the paper but the writing must be your own.
- The [writing center](#) may be helpful.
- **Deadline** to submit topic: March 19
- **Deadline** to submit annotated bibliography: April 1  
(A list of sources (at least two), with descriptions of why you're using them)
- **Deadline** to submit final paper: May 1
- The final paper will be worth 100 points. Grading will be based as follows:
  - 10 points : Submitted paper topic on time
  - 15 points : Submitted annotated bibliography on time
  - 25 points: Paper exposition
  - 50 points: Paper content

## Laptops & Phones

Do not use your laptop, phone or electronic media device in class unless instructed to do so.

## Other Resources

### • Euclidean Geometry

- [Desmos](#) Geometry App
- [Euclid's \*Elements\* Online](#) by [David Joyce](#)
- [Oliver Byrne's 1847 Edition of the \*Elements\*](#). Here's a [sample](#).
- Geometry Applets from [cut-the-knot.org](#). A huge collection of interactive constructions, including:
  - [54 proofs of the pythagorean theorem](#)
  - [Pappus' Theorem](#)

### • Hyperbolic Geometry

- From the (now-defunct) [Geometry Center](#):

- [Models of the Hyperbolic plane](#), including Minkowski, Poincare, Klein
- [Movie of the Klein-Poincare isomorphism](#) (and other [other isomorphisms](#))
- [Hyperbolic geometry](#) links from the [Geometry Junkyard](#) (includes both 2- and 3-dimensional hyperbolic geometry).
- [Poincare Disc Resources](#)
- **Writing Tips**
  - [Writing Suggestions](#)

## Learning Outcomes

Upon successful completion of this course students will be able to:

- Write logical proofs of theorems from geometry.
- Use the parallel postulate to distinguish different geometries.
- Use elements of hyperbolic geometry to solve problems.

*Evaluation of these learning outcomes will be done through a mix of assignments, class exercises, projects, research papers, group work, written & oral quizzes and exams.*

## Course Description

We will cover the first 7 chapters of the textbook, and various parts of chapters 8-14.

- Chapter 1 :: Euclid's Geometry :: Weeks 1 - 2
- Chapter 2 :: Logic & Incidence Geometry :: Weeks 2 - 3
- Chapter 3 :: Hilbert's Axioms :: Weeks 4,5 & 6
- Chapter 4 :: Neutral Geometry :: Weeks 7 & 8
- Chapter 5 :: History of the Parallel Postulate :: Week 9
- Chapter 6 :: Discovery of Non-Euclidean Geometry :: Weeks 10 & 11
- Chapter 7 :: Independence of the Parallel Postulate :: Weeks 12 & 13
- Chapter 8 :: Philosophical Implications :: Week 14

## Natural Sciences Requirement

This course satisfies the Foundation of Natural Sciences/Mathematics requirement. Students who complete this course should be able to demonstrate a basic understanding of mathematical logic; use mathematics to solve scientific or mathematical problems in college classes; express relationships in the symbolic language of mathematics; and appreciate the role of mathematics in analyzing natural phenomena.

## University Policies

**Academic Honesty:** Cheating is not only unethical and pathetic, but is a violation of the Northern Michigan University [Student Code and University Policy](#) and grounds for your dismissal from the University.

**Discrimination & Harassment:** Northern Michigan University does not unlawfully discriminate on the basis of race, color, religion, national origin, gender, age, height, weight, marital status, handicap/disability, sexual orientation or veteran status. If you have a civil rights inquiry, contact the [Affirmative Action Office](#) at 906-227-2420.

**Americans with Disabilities Act Statement:** The University seeks to provide equal access to its programs, services and activities for people with disabilities. If you have a need for disability-related accommodations or services, please inform the Coordinator of [Disability Services](#) in the Dean of Students Office at 2001 C. B. Hedgcock Building (227-1700). at 906-227-1700 as soon as possible. Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.

**The Registrar:** Withdrawing from any course or any matters relating to registration are the responsibility of the student. For more information regarding this topic, check out the [Registrars Website](#).