

Marshall University
MTH 448 / 548: Modern Geometries

Semester and Year	Fall 2018
Course Title	Modern Geometries
Course Number	MTH 448 / 548
Section Number	101
CRN	3054 / 3069
Days and Time	Tuesday, Thursday : 3:30pm – 4:45pm
Location	Smith Hall 511
Credit Hours	3
Prerequisites	C or better in MTH 300

Professor	Dr. Anna Mummert
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Office Hours	Mon, Wed: 12:30 - 1:30pm and Tues, Thurs: 9:30 - 11:30am other hours by appointment

University Policies

By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to

<http://www.marshall.edu/academic-affairs/policies/>

Academic Dishonesty, Excused Absence Policy for Undergraduates, Computing Services Acceptable Use, Inclement Weather, Dead Week, Students with Disabilities, Academic Dismissal, Academic Forgiveness, Academic Probation and Suspension, Affirmative Action, and Sexual Harassment.

Course Description

MTH 448 - Finite geometries, basic background material for the modern development of Euclidean Geometry, other geometries. 3 credit hours. PR: MTH 300.

About this course

Math 448 is an introductory modern geometry course. It is a requirement for 5-adult mathematics education majors. It may be used as an elective for all majors in the mathematics department.

This course will be taught using an inquiry-based learning (IBL) method. IBL is an active learning method with limited traditional lecture. In this course you will deduce theorems, starting from a set

of axioms, by completing a carefully designed series of problems. Presentations and discussions will give you the opportunity to delve deeply into the ideas of geometry and work towards true understanding. My role in the class will be to facilitate discussions and empower your learning.

Topics

Geometry is the study of measurement – shape, size, and position. Euclidean geometry developed as the formal study of the geometry of everyday life, and it is certainly the geometry typically assumed in studies of engineering and calculus. Euclidean geometry also was foundational in the modern practice of proof-based mathematics. Euclid was among the first to state a list of axioms and deduce further facts directly using the axioms (Euclid's *Elements* c. 300 BC).

In this course we will focus on Euclidean geometry and the WVDE high school geometry standards. Specific topics include congruence, including constructions, area, angles, similarity, including similar triangles, circle measures, including trigonometric ratios. We will consider both two and three dimensional shapes. We will explore geometry topics using a variety of technologies.

Student Learning Outcomes

- Students will state and explain the definitions of common geometry terms; apply these definitions to test properties of these concepts; and produce verbal arguments and examples showing that basic properties hold or do not hold.
- Students will discover and prove geometry ideas through completion, presentation, and discussion of guided activities.
- Students will evaluate and summarize their solutions and those of classmates to assess the correctness of ideas presented.
- Students will use a variety of technologies common in the field of geometry, including straight edge and compass, paper folding, and geometry software programs.
- Students will develop and enhance reading, writing, presentation, and discussion skills and strategies.

Each outcome will be practiced via discussions, presentations, homework, in-class activities.

Each outcome will be assessed via exams.

Requirements

Textbook *Euclidean Geometry: A Guided Inquiry Approach*, by David M. Clark. ISBN: 978-0-8218-8985-5.

Straight edge and compass

You need to bring your textbook, straight edge and compass, and writing materials to class every day.

Computer access You must have consistent internet access. You should check MU Online and your official MU email account frequently for announcements.

Assignments

Homework Homework will be assigned each week and due on Tuesdays. These problems will form the basis for the class presentations and discussions for the week.

After the homework is graded and returned, you will have the option to rewrite your solutions and turn them in the next Tuesday.

Presentation and Discussion Much of class time will be devoted to student presentation and discussion of problems from the homework. The goal of the presentations is to spark discussion of the geometric ideas, to foster understanding by all students. There is no penalty for incorrect solutions. All students are expected to present solutions and participate in the discussion.

Exploration Labs There will be several exploratory labs using a variety of technologies common in the field of geometry. The topics of the labs cover material found in the WVDE High School Geometry Standards, but not in the course textbook.

Exams There will be three exams – two in-class and one final exam. Exams will consist of definitions, computations, constructions, and proofs. The final exam will be comprehensive.

- Thursday, September 27
- Thursday, November 8
- Tuesday, December 11 (3:30 - 5:30pm)

Attendance policy

I expect you to attend each class, with the same standards for absences you would use for a professional job. I will record attendance each day. If you need to be absent from class, you should contact me promptly – before the absence, except in case of emergency, just as with a professional job. I will excuse absences that are covered by the university's excused absence policy. I may ask for documentation for repeated absences.

Grading Policy

Homework: 45%
Labs: 5%
Exam 1: 15%
Exam 2: 15%
Final Exam: 20%

Percentage ranges for final grades are as follows:

A = 90-100% B = 80-89% C = 70-79% D = 60-69% F = 0-59%

Academic honesty policy

Plagiarism of any kind is not permitted. Students who plagiarize on an assignment will receive a zero for that assignment, and the university-wide plagiarism policy will be followed. Repeated or especially serious violations may lead to a failing course grade or suspension from the university.

Tentative Course Schedule The problems to be completed each week are listed on the schedule. This schedule is tentative and subject to change.

Week	Dates	Tuesday	Thursday
1	Aug 21, 23	1 – 12	
2	Aug 28, 30	13 – 22	
3	Sept 4, 6	23 – 36	
4	Sept 11, 13	37 – 48	
5	Sept 18, 20	49 – 60	
6	Sept 25, 27	61 – 65	Exam 1
7	Oct 2, 4	66 – 80	
8	Oct 9, 11	81 – 93	
9	Oct 16, 18	94 – 106	
10	Oct 23, 25	107 – 119	
11	Oct 30, Nov 1	120 – 131	
12	Nov 6, 8	132 – 137	Exam 2
13	Nov 13, 15	138 – 150	
	Nov 19 – 22		
14	Nov 27, 29	151 – 161	
15	Dec 4, 6	TBA	
16	Dec 11	Final Exam 3:30 – 5:30pm	

University Schedule

The complete university schedule can be found at

<http://www.marshall.edu/academic-calendar/fall-semester-2018/>