MAT 246 Introduction to Geometry

Summer 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

This course covers both Euclidean and non-Euclidean geometry fundamentals. It explores sets, points, lines, and space, emphasizing relationships like betweeness, incidence, and congruence. Advanced topics include parallelism, similarity, transformations, areas, and volumes. Non-Euclidean geometries are introduced for a broader perspective. Geared towards enhancing geometric intuition and problem-solving skills.

Upon Completion of this Course, students will be able to:

1. Apply geometric principles to solve problems involving betweeness, incidence, congruence, and parallelism;
2. Analyze and interpret geometric transformations and their effects on figures;
3. Calculate areas and volumes of geometric shapes using appropriate methods;
4. Explore the principles and implications of non-Euclidean geometries;
5. Develop critical thinking and problem-solving skills through geometric reasoning and analysis.

PREREQUISITES

MAT 130 Linear Algebra

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
2 Assignments	20 Points
Midterm 1	15 Points
Midterm 2	15 Points
2 Projects	20 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

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

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Gary L. Musser, ***College Geometry: A Problem-Solving Approach With Applications***, 2nd Edition, Pearson College Div, 2007.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Introduction to Geometric Problem Solving Strategies Topic 2: Properties of Points, Lines, and Planes: A Comprehensive Overview Topic 3: Angle Measurement and Classification: Understanding Angles in Geometric Contexts Topic 4: Congruent Triangles: Theorems and Applications in Real-world Scenarios **Assessments:** Assignment 1

Module 2	**Topics:** Topic 5: Similarity and Proportionality in Triangles: Exploring Proportional Relationships Topic 6: Properties of Quadrilaterals: Parallelograms, Rhombuses, Rectangles, and Squares Topic 7: Polygons: Regular and Irregular Polygons and Their Properties Topic 8: Circles: Properties, Chords, and Tangents **Assessments:** Assignment 2 Project 1
Module 3	**Topics:** Topic 9: Properties of Perpendicular and Parallel Lines: Understanding Parallelism and Perpendicularity Topic 10: Geometric Constructions: Using Compass and Straightedge to Construct Figures Topic 11: Area and Perimeter of Plane Figures: Calculating Areas and Perimeters of Various Shapes Topic 12: Volume and Surface Area of Solids: Determining Volumes and Surface Areas of 3D Shapes **Assessments:** Midterm#1 Project 2
Module 4	**Topics:** Topic 13: Transformations: Reflections, Rotations, and Translations in Geometric Figures Topic 14: Symmetry in Geometry: Lines of Symmetry and Rotational Symmetry Topic 15: Introduction to Non-Euclidean Geometries: Exploring Geometries Beyond Euclidean Space Topic 16: Analytic Geometry: Coordinates and Equations of Lines and Circles **Assessments:** Midterm#2
Module 5	**Topics:** Topic 17: Geometric Proofs: Understanding and Constructing Proofs in Geometry Topic 18: Applications of Geometry in Engineering and Architecture: Practical Examples and Case Studies Topic 19: Geometric Problem-Solving Strategies: Indirect Proofs and Contradiction Techniques Topic 20: Real-World Applications of Geometry: Surveying, Navigation, and Design Principles in Practical Situations **Assessments:**

	Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.

2) Assignments submitted in the wrong format will be counted as not submitted.

3) Failure to submit or fulfill any required course component results in failure of the class.

4) Make-up for midterm and final exams only with valid excuses, as defined by the University.

5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities

DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.