

**SOUTHERN UNIVERSITY and A&M COLLEGE
DEPARTMENT OF MATHEMATICS**

**MATH 205
INFORMAL GEOMETRY**

COURSE DESCRIPTION:

This course consists of an intuitive study of points, angles, lines, perpendicularity, parallelism in the plane, basic constructions and proofs, including congruence and similarity of triangles, basic area and volume problems, designed for elementary school teachers.

GENERAL OBJECTIVE:

The aim of the course is to not only teach the suggested content, but to teach pedagogy as well. The course is designed to:

1. Demonstrate the value and development of geometrical theory.
2. Present geometry in an enthusiastic manner, emphasizing thinking skills and hands-on learning.
3. Promote critical thinking skills.
4. Explain how geometrical concepts fit into patterns in the real world.
5. Help students to become effective problem solvers.

Learning Outcomes:

Upon successful completion of this course, the student will be able to:

1. Demonstrate the ability to solve and describe relationships pertaining to geometric problems by using algebraic, spatial, and logical reasoning.
2. Demonstrate the ability to make and test conjectures, and give heuristic proofs to justify conclusions by employing Polya's four steps to problem solving.
3. Solve problems in a real life setting using modeling as a strategy to problem solving.
4. Demonstrate the ability to communicate mathematically by writing in precise mathematical and symbolic notation.
5. Demonstrate knowledge of the basic elements of plane geometry by applying geometric ideas to answer questions about natural, physical, and social phenomena.
6. Demonstrate the ability to use logic by formulating and justifying logical arguments from

- real-world phenomena.
7. Demonstrate the ability to investigate and discover relationships in geometry by using geometric constructions.
 8. Demonstrate understanding of angles by classifying angles, and relating pairs of angles.
 9. Demonstrate the ability to prove lines are parallel or perpendicular by using angle relationships.
 10. Demonstrate the ability to analyze the characteristics and properties of circles and polygons by show the relationship between intercepting arcs and central or inscribed angles.
 11. Demonstrate knowledge of congruency and similarity of triangles by using theorems and postulates.
 12. Demonstrate the ability to explore geometric relationships with coordinate geometry using the language of algebra.
 13. Demonstrate knowledge of two- and three dimensional figures by computing the area and volume of the figures using the appropriate formula.

COURSE CONTENT:

A. Logic

1. Statements, Compound Statements, and Connectives
2. Truth Tables
3. Conjunctions, Disjunctions, and Negations
4. The Conditional
5. Circuits

B. The Basic Figures of Geometry

1. Historical Background
2. Undefined Terms (Point, Line, and Plane)
3. Segments, Rays, and Angles
4. Circles and Triangles
5. Quadrilaterals

C. Measuring Plane and Solid Figures

1. Area of Rectangle, Square, Parallelogram, Triangle, Trapezoid, Rhombus, and Circle
2. Volume of a Cube

D. More on Area and Volume

1. Area of a Sector of a Circle
2. Area of a Segment of a Circle
3. Area and Volume of a Right Prism and Right Circular Cylinder

E. Angles and Perpendicular Lines

1. The Protractor
2. Proofs of Angle Relationships
3. Formal Proofs (Complementary, Supplementary, and Vertical angles)

F. **Parallel Lines and Planes**

1. Parallel lines and transversals
2. Theorems about parallel lines
3. Parallels used in polygons

G. **Congruent Triangles**

1. Ways to Prove Triangles Congruent
2. Proving Corresponding Parts Congruent
3. Isosceles Triangles
4. Triangles with Two Congruent Sides
5. Triangles with Two Congruent Angles

H. **The Right Triangle and the Pythagorean Theorem**

1. The Pythagorean Theorem
2. Special Right Triangles
3. Rectangular Solids

REQUIREMENTS:

1. Paper, pencils, protractor, compass, graph paper, and straight edge.
2. Attend class regularly and punctually.
3. Take and complete all examinations and assignments as scheduled.

ATTENDANCE:

See Southern University catalog regarding class attendance.

ACADEMIC DISHONESTY:

Adhere to honesty and integrity in work submitted for credit in this course and adhere to SUBR's Code of Conduct. (**Refer to current Catalog.**)

DISABILITY STATEMENT:

Learners that are considered as having a disability are to provide the professor with a letter from the Department of Special Education stating the appropriate accommodations required of this course. If you have a documented disability, then please discuss it with personnel at 771-3950 in Room 125 of Blanks Hall.

SUGGESTED OR REQUIRED READING: See professor.

GRADING POLICY: See professor.