

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

**MATH 250
TOPICS IN GEOMETRY**

I. DESCRIPTIVE INFORMATION

- A. Course Number: MATH 250
- B. Course Title: TOPICS IN GEOMETRY
- C. Catalog Description: An axiomatic approach to Euclidean Geometry or to Absolute Geometry with an introduction to Euclidean and Hyperbolic geometries, including basic constructions. The History of Geometry is an assigned part of this course.
- E. Credit Hours: 3 hours
- F. Prerequisite: Consent of professor.
- G. Intended Audience: This course is designed for students in the sciences and those who are prospective teachers of mathematics. Topics include history of geometry, an axiomatic approach to Euclidean geometry with an introduction to Non-Euclidean geometry. Basic graph theory applied to subjects in pure mathematics, basic constructions, and vectors in geometry are part of the course. These learners are exposed to the best teaching practices and several teaching strategies. Multicultural education is embraced allowing for global perspectives of statistical concepts.
- H. Course Professor:
- I. Office Hours:

II. SPECIFICATION OF COURSE GOALS AND LEARNING OUTCOMES

- A. GENERAL GOALS:
 - 1. To provide students with skills that will allow them to use geometry as a tool in other areas of mathematics as well as practical everyday situations.
 - 2. To provide students with an opportunity to gain a knowledge of symmetry and proportion.

3. To develop the skills used in inductive and deductive reasoning.
- B. Learning Outcomes: Upon successful completion of this course, the students will be able to:
1. Demonstrate an understanding of the difference between Euclidean and Non Euclidean geometries by written and/or oral presentations.
 2. Demonstrate the ability to construct sound, logical formal proof of theorems by writing sequences of statements supported by reasons that lead to valid conclusions.
 3. Demonstrate the ability to do geometric constructions by making accurate drawings of geometric figures using a straightedge and a compass.
 4. Demonstrate the ability to relate geometry to algebra by solving problems involving the Cartesian coordinate system, distance and midpoint formulas, and the Pythagorean Theorem.

III. REQUIRED READING

Textbook: *Essentials of Geometry*, 2nd Edition, Authors: Lial, Brown, Steffensen & Johnson, Publisher: Pearson Addison-Wesley.

V. COURSE CONTENTS

1. Foundations of Geometry
 - 1.1 Inductive and Deductive Reasoning
 - 1.2 Points, Lines, and Planes
 - 1.3 Segments, Rays, and Angles
 - 1.4 Introduction to Deductive Proofs
 - 1.5 Formalizing Geometric Proofs
2. Triangles
 - 2.1 Classifying Triangles
 - 2.2 Congruent Triangles
 - 2.3 Proofs Involving Congruence
 - 2.4 Isosceles Triangles Medians, altitudes, and Concurrent Lines
 - 2.5 Proving Right Triangles Congruent
3. Parallel Lines and Polygons
 - 3.1 Indirect Proof and the Parallel Postulate
 - 3.2 Transversals and Angles
 - 3.3 Polygons and Angles
4. Quadrilaterals
 - 4.1 Parallelograms
 - 4.2 Rhombus and Kite
 - 4.3 Rectangles and Squares
 - 4.4 Trapezoids

5. Similar Polygons and the Pythagorean Theorem
 - 5.1 Ratio and Proportion
 - 5.2 Similar Polygons
 - 5.3 Properties of Right Triangles
 - 5.4 Pythagorean Theorem
6. Circles
 - 6.1 Circles and Arcs
 - 6.2 Chords and Secants
 - 6.3 Tangents
 - 6.4 Circles and Regular Polygons
7. Areas of Polygons and Circles
 - 7.1 Areas of Quadrilaterals
 - 7.2 Circumference and Area of a Circle
 - 7.3 Area and Arc Length of a Sector
 - 7.4 Area of a Regular Polygon
8. Solid Geometry
 - 8.1 Planes and Polyhedrons
 - 8.2 Prisms
 - 8.3 Pyramids
 - 8.4 Cylinders and Cones
 - 8.5 Spheres and Composite Figures
9. Analytic Geometry
 - 9.1 The Cartesian Coordinate System, Distance & Midpoint Formulas
 - 9.2 Slope, Equation of a Line
10. Constructions
 - 10.1 Constructions involving lines and Angles
 - 10.2 Constructions involving Triangles, Polygons, and Circles

V. DESCRIPTION OF INSTRUCTIONAL PROCEDURES

Guided Lecture	45%
Discovery Learning (small groups)	25%
Hands-on (Minds on) Computer Lab	15%
Immediate/Frequent Feedback Opportunities	15%

VI. COURSE REQUIREMENTS

A. Academic

Each learner enrolled in this course has set expectations!

- 1) Take and pass chapter examinations. [Beyond 1st exam-expect quasi comprehensive exams.]

- 2) Complete all assignments given during the course of the semester. For computer Lab exercises- Learners will be assigned challenges requiring the use of Geometer's Sketchpad and/or the Internet.
- 3) Possess: Mathematics with Applications , textbook.
- 4) Possess a scientific calculator. Note: see requirement above.
<http://kings.k12.ca.us/math/lessons/ti83tutorial/mainpage.html>
<http://www.howardcc.edu/math/calculator/ti83frame.htm>
- 5) Except for formal reports, 'all' work must be done in pencil.
- 6) OTHER RESOURCES that are designed to help the student achieve the course objectives include: Personal tutoring available free of charge in 306 T. T. Allain (hours posted on door) and also at the Center for Student Success in 107 Stewart Hall. Contact Dr. Hamer Lawrence at 771-4312 for details.

B. Administrative

Each learner enrolled in this course will meet set requirements!

- 1) Attend class regularly and punctually.
- 2) Present excuses in office or on the phone to the professor for absences because of illness or other unavoidable circumstances. Note, however, excuses explain absences, but do not necessarily remove them.
- 3) Adhere to the policy of no make-ups on exams or pop-quizzes.
- 4) 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.)
http://web.subr.edu/fileadmin/files/pdf/Southern_1b_21-39_.pdf
- 5) Adhere to Academic Calendar:
<http://web.subr.edu/index.php?id=268>
- 6) Must possess your own e-mail address.

VII. ASSESSMENT MEASURES & SCHEDULE

The final grade for this course will be determined by the average of the following:

- | <u>Activity</u> | <u>Date(s)</u> |
|----------------------|---------------------------------|
| 1) Class assignments | TBA ≤ 50 points for each |

- 2) Tests **TBA** Approximately 2– 3 100 pts
- 3) Examinations**:
Midterm: 100 - 150 pts **TBA**
Final: 150 – 200 pts **TBA**
- 4) BLACKBOARD & LIVE-text assignments/projects TBA by professor.

VIII. GRADING

89.0 – 100.0	A
79.0 -- 88.9	B
69.0 -- 78.9	C
58.0 -- 68.9	D
Below 58.0	F

IX. DISABILITY STATEMENT

If you have a documented disability, then please discuss it with personnel at 771-3950 in Room 125 of Blanks Hall. 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.

DISCLAIMER: THESE ACTIVITIES AND ASSIGNMENTS ARE TENTATIVE. CHANGES MAY OCCUR DUE TO ASSESSMENT OF LEARNERS BY THE PROFESSOR AND DUE TO THE PROFESSOR.