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Course Outline for MATH 57

PLANE GEOMETRY

Effective: Fall 2004

I. CATALOG DESCRIPTION:

MATH 57 — PLANE GEOMETRY — 3.00 units

Topics in plane geometry include: congruence, similarity, parallel lines, and properties of polygons and circles.

3.00 Units Lecture

Prerequisite

MATH 110 - Elementary Algebra
with a minimum grade of C
or

MATH 110B - Elementary Algebra B
with a minimum grade of C
or

Grading Methods:

Discipline:

	<u>MIN</u>
Lecture Hours:	54.00
Total Hours:	54.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

- A. MATH110
- B. MATH110B

IV. MEASURABLE OBJECTIVES:

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

- A. Identify the four parts of an axiomatic system.
- B. Identify the hypothesis and conclusion in a conditional statement.
- C. Identify the converse and contrapositive of a conditional statement.
- D. Construct direct proofs using the Reflexive, Symmetric, and Transitive properties.
- E. Construct an indirect proof.
- F. Use a compass and a straightedge for geometric constructions.
- G. Classify angles as acute, obtuse, straight, or right angles.
- H. Identify and name specific polygons
 - I. Apply the Protractor, Angle, Segment, and Arc-Addition Postulates.
- J. Identify alternate interior angles and alternate exterior angles.
- K. Prove two lines are parallel.
- L. Prove two triangles are congruent .
- M. Use the Pythagorean Theorem.
- N. Identify and use the Triangle Inequality.
- O. Use proportions to solve word problems.
- P. Use line, segment, and angle relationships in a circle.
- Q. Evaluate areas using formulas.

V. CONTENT:

- A. Statements and reasoning
 - 1. Identify the hypothesis and conclusion of a conditional statement
 - 2. Finding the converse and contrapositive of a conditional statement
 - 3. Identifying the four parts of an axiomatic system
- B. Measurement
 - 1. Use of a ruler and protractor
- C. Angles and their relationships
- D. Introduction to proofs (direct and indirect)

- E. Perpendicular lines
- F. The parallel postulate and special angles
- G. Proving lines parallel
- H. The angles of a triangle
- I. Convex polygons
- J. Congruent triangles
- K. Corresponding parts of congruent triangles
- L. Isosceles triangles
- M. Basic constructions
- N. Identifying quadrilaterals
- O. Properties of quadrilaterals
- P. Similar triangles and polygons
- Q. The Pythagorean Theorem
- R. Special right triangles
- S. Circles and related segments and angles
- T. Angle measures in the circle
- U. Line and segment relationships in the circle
- V. Areas of polygons and circles

VI. METHODS OF INSTRUCTION:

- A. **Lecture** -
- B. Collaborative learning where applicable
- C. Classroom discussion

VII. TYPICAL ASSIGNMENTS:

A. Requiring homework from the textbook is a typical assignment for this course. The amount of problems assigned from each section is dependent on the types of exercises sampled. For example, the section on proportions contains many problems involving short computations in addition to word problems. It would be reasonable to assign at least fifteen computational exercises with a minimum of five word problems. Since proofs require more thought than using a formula, the instructor could assign as many as six proofs per section. B. Handouts and collaborative exercises involving geometric constructions are also typical. For example, the instructor could have their students use time in the classroom to construct an isosceles triangle with base of length c and altitude of length a using a compass and straightedge

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Quizzes
3. Group Projects
4. Home Work
5. Lab Activities
6. Other:
 - a. Methods of evaluation
 1. Examinations
 2. Final Exam
 3. A minimum of one of the following types of assignments should be graded per week.
 - a. homework
 - b. quizzes (announced or unannounced, in class or take home)
 - c. collaborative group activities or labs

B. **Frequency**

1. Frequency of evaluation:
 - a. Recommended minimum of 3 exams plus the final
2. Types of problems (In a geometry course, figures would accompany these exercises):
 - a. With corresponding angles indicated, find m if $m =$
 - b. Given: and
 - c. Prove:
 - d. The distance across a pond is to be measured indirectly by using similar triangles. If $XY = 160$ ft, $YW = 40$ ft, $TY = 120$ ft, and $WZ = 50$ ft, find XT .
 - e. A hot air balloon is held in place by the ground crew at a point that is 21 ft from a point directly beneath the balloon. If the rope is of length 29 ft, how far above ground level is the balloon?
 - f. Given: Two circles which are tangent at the point F
 - g. secant to the first circle
 - h. secant to the second circle
 - i. common internal tangent
 - j. Prove:

IX. TYPICAL TEXTS:

1. Alexander, Koeberlein *Elementary Geometry for College Students*. 3rd ed., Houghton Mifflin Company, 2003.
2. Kay *College Geometry A Discovery Approach*. 2nd ed., Addison Wesley, 2001.
3. Camp *Plane Geometry*. 2nd ed., Kendall/Hunt Publishing Company, 1997.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. A calculator, compass, straightedge, and protractor may be required.