

**PALOMAR COLLEGE**  
**COURSE OUTLINE OF RECORD FOR**  
**DEGREE CREDIT COURSE**

\_\_\_\_\_ Transfer Course x A.A. Degree applicable course  
 (check all that apply)

**COURSE NUMBER AND TITLE:** Math 55 - Geometry

**UNIT VALUE:** 4

**MINIMUM NUMBER OF SEMESTER HOURS:** 64

**BASIC SKILLS REQUIREMENTS:** Appropriate language and computational skills.

**ENTRANCE REQUIREMENTS**

**PREREQUISITE:** A minimum grade of "C" in either Math 50 or Math 50B or eligibility determined through the math placement process.

**COREQUISITE:** None.

**RECOMMENDED PREPARATION:** None.

**SCOPE OF COURSE:** Fundamentals of plane geometry and selected topics from solid geometry developed by both inductive and deductive processes. Especially recommended for prospective teachers and/or students who will be taking Trigonometry.

**SPECIFIC COURSE OBJECTIVES:**

- Successful students will form conjectures using inductive reasoning.
- Successful students will distinguish between known facts and conjectures that should be proved.
- Successful students will prove results using definitions, postulates, and theorems, by deductive reasoning.
- Successful students will apply the basic definitions, postulates and theorems of geometry in solving problems.
- Successful students will develop critical thinking skills by solving high level, multi-step problems.

**CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:**

- I. Elements of Geometry.
  - A. Meaning of sets.  
Representing sets, relationships between sets, Venn diagrams, real numbers, the number line, distance between points, absolute value.
  - B. Points, lines, and planes.  
Basic undefined terms, essential definitions.
  - C. Angles and their measurement.  
Angles, measurement of angles, some special angles and angle relationships.
  - D. Additional definitions.  
Triangles, general polygons, quadrilaterals, circles, circles in relation to other figures, spheres.

- II. Deduction and Proof.
  - A. The meaning of deductive thinking.  
Inductive reasoning, deductive reasoning, if-then statements.
  - B. Bases for proof.  
Deductive thinking in Algebra; definitions and postulates in geometry; properties of real numbers, equality and inequality.
  - C. Initial postulates and theorems.  
Points, lines, and planes; lines and segments; deductive proofs.
  
- III. Angle relationships; perpendicular lines.
  - A. Angle relationships.  
Initial postulates and theorems; straight angles, right angles, and perpendicular lines.
  - B. Formal proofs.  
Supplementary angles, complementary angles, vertical angles, the demonstration of a theorem.
  
- IV. Parallel lines and planes.
  - A. When lines and planes are parallel.  
Basic properties, transversals and special angles, indirect proof.
  - B. How to show that lines are parallel.  
The parallel postulate, converses of earlier statements about parallels, applying parallels to triangles.
  
- V. Congruent triangles.
  - A. Proving that triangles are congruent.  
Corresponding parts of two triangles, formal treatment of congruent triangles, more ways to prove triangles congruent, overlapping triangles.
  - B. Using congruent triangles to prove segments and angles equal.  
Proving corresponding parts equal, isosceles triangles, applying properties of congruent triangles to quadrilaterals.
  
- VI. Similar polygons.
  - A. Some principles of Algebra.  
Ratio and proportion, special properties of a proportion.
  - B. What similarity means.  
Similar polygons, similar triangles, properties of special segments in a triangle.
  - C. Similarity in right triangles.  
Properties of the altitude drawn to the hypotenuse in a right triangle, the Pythagorean theorem, special right triangles: 30-60-90 and 45-45-90.
  - D. Applying the Pythagorean theorem.  
Right triangles in three-dimensional figures, projections into a plane.
  - E. Right triangle trigonometry.
  
- VII. Circular arcs and angles.
  - A. Measures of arcs and angles.  
Arcs and central angles, inscribed angles, other angles formed by secants and tangents.
  - B. Lines and segments related to circles.  
Chords of the same circle or equal circles, proportions involving chords, secants, and tangents.

VIII. Constructions and loci.

A. Constructions.

What construction means; permissible instruments and basic angle constructions, constructing parallel lines and perpendicular lines, constructions involving circles, constructing special segments.

B. Locus.

The meaning of locus, intersection of loci, construction by means of loci.

IX. Coordinate geometry.

A. Relating points and numbers.

Graphs on one axis, plotting points in two dimensions, symmetry, graphs meeting given conditions.

B. Finding and using distances.

The distance formula, the circle, the midpoint formula.

C. The graphing of lines.

The slope of a line, parallel, and perpendicular lines, writing equations of lines, additional properties of lines.

X. Areas of polygons and circles.

A. Quadrilaterals and triangles.

What area means: Basic postulates, and definitions, areas of rectangles and parallelograms, areas of triangles, and trapezoids, proofs involving areas, comparing areas of similar triangles.

B. Areas of regular polygons.

Special properties of a regular polygon, areas of regular polygons, comparing areas of similar polygons.

C. Circles, sectors, and segments.

The circle as limiting case of a regular polygon; area of a circle; arcs, sectors, and segments.

D. Area constructions.

Constructions involving a fourth proportional, constructions involving a square root.

XI. Areas and volumes of solids.

A. Prisms and Pyramids.

B. Cylinders, cones and spheres.

C. Areas and volumes of similar solids.

**REQUIRED READING:** Text appropriate for the course, such as the following:

Lial, Margaret L., Arnold R. Stephensen, and L. Murphy Johnson. *Essentials of Geometry for College Students*. U.S.A.: HarperCollins, 1990

**SUGGESTED READING:** None.

**REQUIRED WRITING:** Homework assignments of 1-10 pages each will require the students to write out detailed solutions using correct mathematical notation, logic, and proper English. Examinations will require the same.

## OUTSIDE ASSIGNMENTS:

Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.

Reading assignments, review of lecture material, assigned problems sets.

## INSTRUCTIONAL METHODOLOGY:

### Check all that apply:

- lecture
- laboratory
- lecture-laboratory combination
- directed study

May include the following: lecture and discussion; homework problems exhibited on the board by students and discussed; students' questions discussed and answered; students answer questions posed by the instructor; written exams

## DISTANCE LEARNING:

This course may be offered as a distance learning course and meets Title 5 regulations 55370, 55372, 55374, 55376, 55378, and 55380.

Yes  No

### If yes, check all that apply:

- Television Course (Video one-way, e.g. ITV, video cassette, etc.)
- Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)
- Two-Way Video Conferencing (Two-way interactive video and audio)
- One-Way Video Conferencing (One-way interactive video and two-way interactive audio)
- Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

**GRADING POLICY AND STANDARDS** (include methods of determining whether the stated objectives have been met by students): The semester grade will be calculated in the following manner:

Written exams:	60-80% of grade
Final exam:	20-40% of grade
Homework:	0-20% of grade

## IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?

Yes  No  Number of times course may be taken for credit: 1

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable:

**CONTACT PERSON: David Lowenkron, x2704**

**SIGNATURES ON FILE:**