1. COURSE NUMBER, TITLE, UNITS AND PRINCIPAL/DEPARTMENT APPROVED DESCRIPTION

MGS252-14 GEOMETRY PL/S 10.0 UNITS

According to the Mathematics Framework for California Public Schools, “the main purpose of the geometry curriculum is to develop geometric skills and concepts and the ability to construct formal logical arguments and proofs in a geometric setting.” Therefore, the students will write and analyze proofs including proofs by contradiction, and will have their first encounter with an axiomatic system of mathematics. Students will know, derive, prove theorems, and solve problems involving a variety of geometric figures in 2-dimensional as well as 3-dimensional systems. Students will be introduced to the basics of right triangle trigonometry. Although the curriculum is overwhelmingly Euclidean, students will work with coordinate geometry and work with transformations of geometric figures in the coordinate plane and space.

2. GENERAL INFORMATION

Term and year:

Name of instructor:

Office number:
Telephone number:

E-mail address:

3. TEXTBOOKS AND/OR RECOMMENDED OR REQUIRED READINGS
Geometry is a course required for graduation. Geometry is aligned with the California State Standards for Mathematics. Geometry uses logical reasoning, measurement, and geometric construction to investigate the special relationships of lines, angles, triangles, circles and polygons. Through these relationships, we will investigate congruence and similarities of triangles, area and volume, the Pythagorean Theorem, geometric proofs and the basics of trigonometry. Students will study and demonstrate knowledge of the properties of circles, polygons, similar and congruent figures, lines, angles, and planes. Students will construct and judge the validity of logical arguments. Students will use geometric tools and technology. Students will calculate length, area, and volume and demonstrate an understanding of transformations and symmetry. Algebraic skills are continuously reviewed and strengthened through geometric applications.
5. COURSE OBJECTIVES

- Demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.
- Write geometry proofs, including proofs by contradiction.
- Construct and judge the validity of a logical argument and give counterexamples to disprove a statement.
- Prove basic theorems involving congruence and similarity.
- Prove that triangles are congruent or similar, and are able to use the concept of corresponding parts of congruent triangles.
- Know and are able to use the triangle inequality theorem.
- Prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.
- Know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.
- Compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.
- Compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.
- Determine how changes in dimension affect the perimeter, area, and volume of common geometric figures and solids.
- Find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.
- Prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.
- Prove the Pythagorean theorem.
- Use the Pythagorean theorem to determine distance and find missing lengths of sides in right triangles.
- Perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line.
- Prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.
- Know the definitions of the basic trigonometric functions defined by the angles of a right triangle. Know and are able to use elementary relationships between them.
- Use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.
- Know and are able to use angle and side relationships in problems with special right triangles, such as 30, 60, and 90 triangles and 45, 45, and 90 triangles.
- Prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.
- Know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.
6. COURSE REQUIREMENTS, ATTENDANCE AND SPECIFIC GRADING POLICY

Grading Scale:

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>90% - 100%</td>
<td>A</td>
</tr>
<tr>
<td>80% - 89%</td>
<td>B</td>
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<tr>
<td>70% - 79%</td>
<td>C</td>
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<tr>
<td>60% - 69%</td>
<td>D</td>
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<tr>
<td>0 – 59%</td>
<td>F</td>
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</tbody>
</table>

75% Tests, group tests, quizzes, other assessments, common unit exams, **final exams**

25% Participation in all class activities, and completion of assignments, warm-ups, practice, projects

*Note: Extra credit will not exceed 2% of the grade in the participation category. No more than one redemption test for any unit test will be offered each semester.

**Attendance**

The math department complies with the district protocol the can be viewed at [www.scusd.edu](http://www.scusd.edu). Make-up work/tests are the students’ responsibility and are only issued with a valid re-admit.
7. OUTLINE OF CLASS SESSIONS

Unit 1 (13 days)
(1.1) Patterns & Inductive Reasoning
(1.2) Points, Lines, & Planes
(1.3) Segments & Their Measures
(1.4) Angles & Their Measures
(1.5) Segment & Angle Bisectors

Unit 2 (8 days)
(2.1) Conditional Statements
(2.2) Definitions & Biconditional Statements
(2.3) Deductive Reasoning
(2.4) Reasoning with Properties from Algebra
(2.5) Proving Statements About Segments

Unit 3 (11 days)
(1.6) Angle Pair Relationships
(2.6) Proving Statements About Angles
(3.1) Lines & Angles
(3.2) Proof & Perpendicular Lines
(3.3) Parallel Lines & Transversals
(3.4) Proving Lines are Parallel
(3.5) Using Properties of Parallel Lines

Unit 4 (8 days)
(4.1) Triangles & Angles
(6.1) Polygons
(11.1) Angle Measures in Polygons
(12.1) Exploring Solids

Unit 5 (13 days)
(5.5) Inequalities in One Triangle
(9.2) The Pythagorean Theorem
(9.3) The Converse of the Pythagorean Theorem
(9.4) Special Right Triangles
(9.5) Trigonometric Ratios
(9.6) Solving Right Triangles

Unit 6 (12 days)
(1.7) Introduction to Perimeter, Area, & Circumference
(11.2) Areas of Regular Polygons
(7.1) Rigid Motion in a Plane
(7.2) Reflections
(7.3) Rotations

Unit 7 (10 days)
(12.2) Surface Area of Prisms & Cylinders
(12.3) Surface Area of Pyramids & Cones
(12.4) Volume of Prisms & Cylinders
(12.5) Volume of Pyramids & Cones
(12.6) Surface Area & Volume of Spheres

Unit 8 (10 days)
(4.2) Congruence & Triangles
(4.3) Proving Triangles are Congruent: SSS and SAS
(4.4) Proving Triangles are Congruent: ASA and AAS
(4.5) Using Congruent Triangles
(4.6) Isosceles, Equilateral, & Right Triangles

Unit 9 (11 days)
(6.2) Properties of Parallelograms
(6.3) Proving Quadrilaterals are Parallelograms
(6.4) Rhombuses, Rectangles, & Squares
(6.5) Trapezoids and Kites
(6.6) Special Quadrilaterals
(6.7) Areas of Triangles & Quadrilaterals

Unit 10 (17 days)
(8.1) Ratio & Proportion
(8.2) Problem Solving in Geometry with Proportions
(8.3) Similar Polygons
(8.4) Similar Triangles
(8.5) Proving Triangles are Similar
(8.6) Proportions & Similar Triangles
(9.1) Similar Right Triangles
(11.3) Perimeters & Areas of Similar Figures
(12.7) Similar Solids

Unit 11 (14 days)
(10.1) Tangents to Circles
(10.2) Arcs & Chords
(10.3) Inscribed Angles
(10.4) Other Angle Relationships in Circles
(10.5) Segment Lengths in Circles
(11.4) Circumference & Arc Length
(11.5) Areas of Circles & Sectors
(11.6) Geometric Probability

Unit 12 (10 days)
(3.6) Parallel Lines in the Coordinate Plane
(3.7) Perpendicular Lines in the Coordinate Plane
(4.7) Triangles & Coordinate Proof
(10.6) Equations of Circles

8. GENERAL STATEMENTS

Late work resulting from student absences will only be accepted if absence is excused through the attendance office.

9. CROSS INDEXING KEY OF COURSE OBJECTIVES TO REQUIRED STANDARDS
<table>
<thead>
<tr>
<th>&quot;Key Standards&quot; State Standards (from the “Big Test” Blueprints)</th>
<th>School Community Standards / 21st Century Thinking and Learning</th>
<th>Bloom's Level</th>
<th>Priority Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Students write geometric proofs, including proofs by contradiction.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>3. Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
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<td>6</td>
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<tr>
<td>4. Students prove basic theorems involving congruence and similarity.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>5. Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
<td>5</td>
<td>3</td>
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<tr>
<td>6. Students know and are able to use the triangle inequality theorem.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
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<td>1</td>
</tr>
<tr>
<td>7. Students prove and use theorems involving properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
<td>5</td>
<td>8</td>
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<tr>
<td>“Key Standards” State Standards (from the “Big Test” Blueprints)</td>
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<tr>
<td>8. Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
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<td>6</td>
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<tr>
<td>9. Students compute the volume and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
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<tr>
<td>10. Students compute the areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
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<tr>
<td>11. Students determine how changes in dimensions affect the perimeter, area, and volume of common geometry figures and solids.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
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</tr>
<tr>
<td>12. Students find and use measures of sides and interior and exterior angles of triangles and polygons to classify figures and solve problems.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>13. Students prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
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<td>&quot;Key Standards&quot; State Standards (from the &quot;Big Test&quot; Blueprints)</td>
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<tr>
<td>14. Students prove the Pythagorean Theorem.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
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</tr>
<tr>
<td>15. Students use the Pythagorean Theorem to determine distance and find missing lengths of sides of right triangles.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>16. Students perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through the point off the line.</td>
<td>LEARNING SKILLS: INTERPERSONAL AND SELF-DIRECTIONAL SKILLS</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>17. Students prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>18. Students know the definitions of the basic trigonometric functions defined by the angles of a right triangle. They also know and are able to use elementary relationships between them.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>19. Students use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
<td>3</td>
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</table>
### Syllabus for JFK High School, Sacramento, CA

**Chad Sweitzer, Principal**

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<tr>
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<tbody>
<tr>
<td>20. Students know and are able to use angle and side relationships in problems with special right triangles.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>21. Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.</td>
<td>LEARNING SKILLS: INFORMATION AND COMMUNICATION SKILLS</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>22. Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.</td>
<td>LEARNING SKILLS: THINKING AND PROBLEM-SOLVING SKILLS</td>
<td>6</td>
<td>5</td>
</tr>
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</table>

**Totals:** 100