Perris Union High School District
Course of Study

A. COURSE INFORMATION

Course Title:
Geometry
- ❑ New
- ✓ Revised

Transcript Title/Abbreviation:
(To be assigned by Educational Services)

Transcript Course Code/Number:
(To be assigned by Educational Services)

Subject Area:
- ❑ Social Science
- ❑ English
- ✓ Mathematics
- ❑ Laboratory Science
- ❑ World Languages
- ❑ Visual or Performing Arts
- ❑ College Prep Elective
- ❑ Other

Is this classified as a Career Technical Education course?
- ❑ Yes
- ✓ No

Grade Level
- ❑ MS
- ❑ HS
- ❑ 5
- ❑ 6
- ❑ 7
- ❑ 8
- ✓ 9
- ✓ 10
- ✓ 11
- ✓ 12

Required for Graduation:
- ❑ Yes
- ✓ No

Meets UC/CSU Requirements?
- ✓ Yes
- ❑ No

Was this course *previously approved by UC* for PUHSD?
- ✓ Yes
- ❑ No

(Will be verified by Ed Services)

Credential Required to teach this course:
Mathematics

To be completed by Human Resources only.

Signature _____ Date 4/3/17

Meets "Honors" Requirements?
- ❑ Yes
- ✓ No

Meets "AP" Requirements?
- ❑ Yes
- ✓ No

Submitted by: Amanda Dacton
Site: SSC
Date: 4/28/17

Unit Value/Length of Course:
- ❑ 0.5 (half year or semester equivalent)
- ✓ 1.0 (one year equivalent)
- ❑ 2.0 (two year equivalent)
- ❑ Other:

Approvals	Name/Signature	Date
Director of Curriculum & Instruction		5/1/17
Asst. Superintendent of Educational Services		5.4.17
Governing Board		

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❑ No

Was this course *previously approved by UC* for PUHSD?
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❑ No
(Will be verified by Ed Services)

Meets "AP" Requirements?
❑ Yes
✓ No

Submitted by: Amanda Dacton
Site: SSC
Date: 4/28/17

Credential Required to teach this course:

To be completed by Human Resources only.

Signature **Date**

Meets "Honors" Requirements?
❑ Yes
✓ No

Unit Value/Length of Course:
❑ 0.5 (half year or semester equivalent)
✓ 1.0 (one year equivalent)
❑ 2.0 (two year equivalent)
❑ Other:

Approvals	Name/Signature	Date
Director of Curriculum & Instruction		5/1/17
Asst. Superintendent of Educational Services		
Governing Board		

Prerequisite(s) (REQUIRED):
Successful completion of Algebra 1
Corequisite(s) (REQUIRED):
None
Brief Course Description (REQUIRED):
The fundamental purpose of the Geometry course is to formalize and extend students' geometric experiences from the middle grades. This course includes standards from the conceptual categories of Geometry and Statistics and Probability. In this Geometry course, students explore more complex geometric situations and deepen their explanations of geometric relationships, presenting and hearing formal mathematical arguments. Important differences exist between this course and the historical approach taken in geometry classes. For the Geometry course, instructional time should focus on six critical areas: (1) establish criteria for congruence of triangles based on rigid motions; (2) establish criteria for similarity of triangles based on dilations and proportional reasoning; (3) informally develop explanations of circumference, area, and volume formulas; (4) apply the Pythagorean Theorem to the coordinate plane; (5) prove basic geometric theorems; and (6) extend work with probability.

B. COURSE CONTENT

Course Purpose (REQUIRED):
What is the purpose of this course? Please provide a brief description of the goals and expected outcomes. Note: More specificity than a simple recitation of the State Standards is needed.

The fundamental purpose of the Geometry course is to formalize and extend students' geometric experiences from the middle grades. This course includes standards from the conceptual categories of Geometry and Statistics and Probability. Some standards are repeated in multiple higher mathematics courses; therefore instructional notes, which appear in brackets, indicate what is appropriate for study in this particular course.

In this Geometry course, students explore more complex geometric situations and deepen their explanations of geometric relationships, presenting and hearing formal mathematical arguments. Important differences exist between this course and the historical approach taken in geometry classes. For example, transformations are emphasized in this course.

For the Geometry course, instructional time should focus on six critical areas: (1) establish criteria for congruence of triangles based on rigid motions; (2) establish criteria for similarity of triangles based on dilations and proportional reasoning; (3) informally develop explanations of circumference, area, and volume formulas; (4) apply the Pythagorean Theorem to the coordinate plane; (5) prove basic geometric theorems; and (6) extend work with probability.

(1) Students have prior experience with drawing triangles based on given measurements and performing rigid motions including translations, reflections, and rotations. They have used these to develop notions about what it means for two objects to be congruent. In this course, students establish triangle congruence criteria, based on analyses of rigid motions and formal constructions. They use triangle congruence as a familiar foundation for the development of formal proof. Students prove theorems—using a variety of formats including deductive and inductive reasoning and proof by contradiction—and solve problems about triangles, quadrilaterals, and other polygons. They apply reasoning to complete geometric constructions and explain why they work.

(2) Students apply their earlier experience with dilations and proportional reasoning to build a formal understanding of similarity. They identify criteria for similarity of triangles, use similarity to solve problems, and apply similarity in right triangles to understand right triangle trigonometry, with particular attention to special right triangles and the Pythagorean Theorem. Students derive the Laws of Sines and Cosines in order to find missing measures of general (not necessarily right) triangles, building on their work with quadratic equations done in Algebra I. They are able to distinguish whether three given measures (angles or sides) define 0, 1, 2, or infinitely many triangles.

(3) Students' experience with three-dimensional objects is extended to include informal explanations of circumference, area, and volume formulas. Additionally, students apply their knowledge of two-dimensional shapes to consider the shapes of cross-sections and the result of rotating a two-dimensional object about a line.

(4) Building on their work with the Pythagorean Theorem to find distances, students use the rectangular coordinate system to verify geometric relationships, including properties of special triangles and quadrilaterals, and slopes of parallel and perpendicular lines, which relates back to work done in the Algebra I course. Students continue their study of quadratics by connecting the geometric and algebraic definitions of the parabola. 1

(5) Students prove basic theorems about circles, with particular attention to perpendicularity and inscribed angles, in order to see symmetry in circles and as an application of triangle congruence criteria. They study relationships among segments on chords, secants, and tangents as an application of similarity. In the Cartesian coordinate system, students use the distance formula to write the equation of a circle when given the radius and the coordinates of its center. Given an equation of a circle, they draw the graph in the coordinate plane, and apply techniques for solving quadratic equations—which relates back to work done in the Algebra I course—to determine intersections between lines and circles or parabolas and between two circles.

(6) Building on probability concepts that began in the middle grades, students use the language of set theory to expand their ability to compute and interpret theoretical and experimental probabilities for compound events, attending to mutually exclusive events, independent events, and conditional probability. Students should make use of geometric probability models wherever possible. They use probability to make informed decisions.

The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.

Course Outline (REQUIRED):
Detailed description of topics covered. All historical knowledge is expected to be empirically based, give examples. Show examples of how the text is incorporated into the topics covered.

Students will learn:

- Algebra
  - Properties
    - In the transition from arithmetic to algebra , attention shifts from arithmetic operations to use of the properties of these operations.
    - All of the facts of arithmetic and algebra follow from certain properties.
  - Variable
    - Quantities are used to form expressions, equations and inequalities.
    - An expressions refer to a quantity but does not make a statement about it/ An equation is a statement about the quantities it mentions.
    - Using variables in place of numbers in equations allow the statement of relationships among numbers that are unknown or unspecified.
  - Equivalence
    - A single quantity may be represented by many different expressions.
    - The facts about a quantity may be expressed by many different equations or inequalities.
  - Solving Equations and Inequalities
    - Solving an equation is the process of rewriting the equation to make what it says about its variable(s) as simple as possible.
    - Properties of numbers and equality can be used to transform an equation (or inequality) into equivalent, simpler equations (or inequalities) in order to find solutions.
    - Useful information about equations and inequalities (including solutions) can be found by analyzing graphs or tables.
    - The numbers and types of solutions vary predictably, based on the type of equation.
  - Proportionality
    - Two quantities are proportional if they have the same ratio in each instance where they are measured together
    - Two quantities are inversely proportional if they have the same product in each instance where they are measured together.
  - Function
    - A function is a relationship between variables in which each value of the input variable is associated with a unique value of the output variable.
    - Functions can be represented in a variety of ways, such as graphs, tables, equations, or words. Each representation is particularly useful in certain situations.
    - Some important families of functions are developed through transformations of the simplest form of the function.
    - New functions can be made from other functions by applying arithmetic operations or by applying one function to the output of another.
  - Modeling
    - Many real-world mathematical problems can be represented algebraically. These representations can lead to algebraic solutions.
    - A function that models a real-world situation can then be used to make estimates or predictions about future occurrences.

- Statistics and Probability
  - Data Collection and Analysis
    - Sampling techniques are used to gather data from real-world situations. If the data are representative of the larger population, inferences can be made about that population.
    - Based sampling techniques yield data unlikely to be representative of the larger population.
    - Sets of numerical data are described using measures of central tendency and dispersion.
  - Data Representation
    - The most appropriate data representations depend on the type of data-quantitative or qualitative, and univariate or bivariate.
    - Line plots, boxplots, and histograms are different ways to show distribution of data over a possible range of values.
  - Probability
    - Probability expresses the likelihood that a particular event will occur.
    - Data can be used to calculate an experimental probability, and mathematical properties can be used to determine a theoretical probability.
    - Either experimental or theoretical probability can be used to make predictions or decisions about future events.
    - Various counting methods can be used to develop theoretical probabilities.
- Geometry
  - Visualization
    - Visualization can help you connect properties of real objects with two-dimensional drawings of these objects.
  - Transformations
    - Transformations are mathematical functions that model concrete operations with figures.
    - Transformations may be described geometrically or by coordinates.
    - Symmetries of figures may be defined and classified by transformations.
  - Measurement
    - Some attributes of geometric figures, such as length, area, volume, and angle measure, are measureable. Units are used to describe these attributes.
  - Reasoning and Proof
    - Definitions establish meaning and remove possible misunderstanding.
    - Other truths are more complex and difficult to see. It is often possible to verify complex truths by reasoning from simpler ones by using deductive reasoning.
  - Similarity
    - Two geometric figures are similar when corresponding lengths are proportional and corresponding angles are congruent.
    - Areas of similar figures are proportional to the squares of their corresponding lengths.
    - Volumes of similar figures are proportional to the cubes of their corresponding lengths.
  - Coordinate Geometry
    - A coordinate system on a line on which points are labeled, corresponding to the real numbers.
    - A coordinate system in a plane is formed by two perpendicular number lines, called x- and y-axes, and the quadrants they form. The coordinate plane can be used to graph many functions.
    - It is possible to verify some complex truths using deductive reasoning in combination with Distance, Midpoint, and Slope formulas.

Writing Assignments (REQUIRED): *Give examples of the writing assignments and the use of critical analysis within the writing assignments.*
Writing assignments will include: • Justifications and/or Explanations • Cornell Notes • Assessments • Projects/Performance Tasks • Journals/Learning Logs – Reflections/Summaries • Writing Prompts • Other CFUs (i.e.Warm ups and Tickets out the Door)

INSTRUCTIONAL MATERIALS (REQUIRED)	
Textbook #1	
Title: Geometry Student Edition + Digital Courseware + MathXL (8-year licence)	Edition: First
Author: Charles, Hall, Kennedy, Bellman, Bragg, Handlin, Murphy and Wiggins	ISBN: 13:9780133315097
Publisher: Pearson	Publication Date: 2015
Usage: ✓ Primary Text ❑ Read in entirety or near	
Textbook #2	
Title:	Edition:
Author:	ISBN:
Publisher:	Publication Date:
Usage: ❑ Primary Text ❑ Read in entirety or near	
Supplemental Instructional Materials *Please include online, and open source resources if any.*	

9780133281231	Teacher's Edition	$107.97
9780133185997	Teacher Resource DVD	$100.97
9780133281101	Overview and Implementation Guide	$9.97
9780133185942	Student Companion Book	$6.47
9780133185959	Student Companion Teacher's Guide	$21.97
9780133185966	Practice & Problem Solving Workbook	$6.47
9780133188479	Practice & Problem Solving Teacher's Guide	$21.97
9780133185980	Standards Practice & Review Workbook	$4.97
9780133185973	Standards Practice & Review Teacher's Guide	$32.47
9780133188462	All-In-One Teaching Resources	$212.47
9780133706086	Teaching w/TI Technology Booklet w/CD-ROM	$265.47
9780133288155	Teacher's Online Access Pack	$318.47
9780133185652	ExamView CD-ROM	$137.97
9780133196948	TI N-Spire Lesson Support CD-Rom	$424.47
9780133185669	Answers and Solutions Key CD-ROM	$159.47
9780133185966	Practice & Problem Solving Workbook	$6.47

Estimated costs for classroom materials and supplies (REQUIRED). *Please describe in detail.*
If more space is needed than what is provided, please attach backup as applicable.

Cost for class set of textbooks: $ 6712.92	Description of Additional Costs: Per contract the additional resources are provided free of cost.
Additional costs:$ 0	
Total cost per class set of instructional materials:	$ 6712.92

Key Assignments (REQUIRED):

Please provide a detailed description of the Key Assignments including tests, and quizzes, which should incorporate not only short answers but essay questions also. How do assignments incorporate topics? Include all major assessments that students will be required to complete

Key Assignments will include:

- End of Unit Assessments
- Daily/Lesson Quizzes
- Semester Benchmarks/Finals
- Performance Tasks/ Projects
- Homework
- Midterm/mid-unit Assessments
- Cornell Notes

Instructional Methods and/or Strategies (REQUIRED):

Please list specific instructional methods that will be use.

Instructional Strategies will include:

- Direct Instruction
- Targeted Feedback
- Reciprocal Teaching
- Collaboration
- Adapting to learning styles and multiple intelligences
- Realia
- Modeling
- Guided and Independent practice
- Partner/ Group work
- Spiraling
- Questioning strategies that look for participation and content understanding

Assessment Methods and/or Tools (REQUIRED):

Please list different methods of assessments that will be used.

Assessment Methods will include:

- Type of Questions include:
  - Open Response
  - Multiple Choice
  - Performance Assessment\
  - Multiple Choice
- Investigations
- Projects
- Self-assessment
- Whiteboards
- Find the error
- Portfolios/"Notebooks"
- Ticket out the Doors

- Homework

Platforms include: Pearson, Eadms, Haiku, Desmos and MathXL

COURSE PACING GUIDE AND OBJECTIVES (REQUIRED)				
Day(s)	**Objective**	**Standard(s)**	**Chapter(s)**	**Reference**
10-18	**Tools for Geometry** 1-1 Nets and Drawings for Visualizing Geometry 1-2 Points, Lines, and Planes 1-3 Measuring Segments 1-4 Measuring Angles 1-5 Exploring Angle Pairs Prepares for 1-6 Basic Constructions 1-7 Midpoint and Distance in the Coordinate Plane 1-8 Perimeter, Circumference, and Area	G-CO.1 G-GPE.6 G-CO.12 G-GPE.4 G-GPE.7 N-Q.1	Chapter 1	Essential Standards Addressed
9-15	**Reasoning and Proof** 2-1 Patterns and Inductive Reasoning 2-2 Conditional Statements 2-3 Biconditionals and Definitions 2-4 Deductive Reasoning 2-5 Reasoning in Algebra and Geometry 2-6 Proving Angles Congruent	G-CO.9 G-CO.10 G-CO.11	Chapter 2	
13-21	**Parallel and Perpendicular Lines**	G-CO.1	Chapter 3	

	3-1 Lines and Angles 3-2 Properties of Parallel Lines 3-3 Proving Lines Parallel 3-4 Parallel and Perpendicular Lines 3-5 Parallel Lines and Triangles 3-6 Constructing Parallel and Perpendicular Lines 3-7 Equations of Lines in the Coordinate Plane 3-8 Slopes of Parallel and Perpendicular Lines	G-CO.12 G-MG.3 G-CO.9 G-CO.10 G-CO.13 G-GPE.5		
15-22	**Congruent Triangles** 4-1 Congruent Figures 4-2 Triangle Congruence by SSS and SAS 4-3 Triangle Congruence by ASA and AAS 4-4 Using Corresponding Parts of Congruent Triangles 4-5 Isosceles and Equilateral Triangles 4-6 Congruence in Right Triangles 4-7 Congruence in Overlapping Triangles	G-SRT.5 G-CO.12 G-CO.10 G-CO.13	Chapter 4	
12-19	**Relationships Within Triangles** 5-1 Midsegments of Triangles 5-2 Perpendicular and Angle Bisectors 5-3 Bisectors in Triangles 5-4 Medians and Altitudes 5-5 Indirect Proof Extends	G-CO.10 G-SRT.5 G-CO.9 G-CO.12	Chapter 5	

	5-6 Inequalities in One Triangle Extends 5-7 Inequalities in Two Triangles Extends			
17-26	**Polygons and Quadrilaterals** 6-1 The Polygon-Angle Sum Theorems 6-2 Properties of Parallelograms 6-3 Proving That a Quadrilateral Is a Parallelogram 6-4 Properties of Rhombuses, Rectangles, and Squares 6-5 Conditions for Rhombuses, Rectangles, and Squares 6-6 Trapezoids and Kites 6-7 Polygons in the Coordinate Plane 6-8 Applying Coordinate Geometry 6-9 Proofs Using Coordinate Geometry	G-SRT.5 G-CO.11 G-GPE.7 G-GPE.4	Chapter 6	
10-15	**Similarity** 7-1 Ratios and Proportions 7-2 Similar Polygons 7-3 Proving Triangles Similar 7-4 Similarity in Right Triangles 7-5 Proportions in Triangles	G-SRT.5 G-GPE.5 G-SRT.4	Chapter 7	
12-18	**Right Triangles and Trigonometry** 8-1 The Pythagorean Theorem and Its Converse	G-SRT.4 G-SRT.8 G-SRT.7 G-MG.1	Chapter 8	

	8-2 Special Right Triangles 8-3 Trigonometry 8-4 Angles of Elevation and Depression 8-5 Law of Sines 8-6 Law of Cosines	G-SRT.10 G-SRT.11		
9-16	**Transformations** 9-1 Translations 9-2 Reflections 9-3 Rotations 9-4 Compositions of Isometries 9-5 Triangle Congruence 9-6 Dilations 9-7 Similarity Transformations	G-CO.2 G-CO.4 G-CO.5 G-CO.6 G-CO.7 G-CO.8 G-SRT.2 G-SRT.3	Chapter 9	
12-20	**Area** 10-1 Areas of Parallelograms and Triangles 10-2 Areas of Trapezoids, Rhombuses, and Kites 10-3 Areas of Regular Polygons 10-4 Perimeters and Areas of Similar Figures 10-5 Trigonometry and Area 10-6 Circles and Arcs 10-7 Areas of Circles and Sectors 10-8 Geometric Probability	G-GPE.7 G-MG.1 G-CO.13 G-GMD.3 G-SRT.9 G-CO.1 G-C.1 G-C.2 G-C.5 S-CP.1	Chapter 10	

9-16	**Surface Area and Volume** 11-1 Space Figures and Cross Sections 11-2 Surface Areas of Prisms and Cylinders 11-3 Surface Areas of Pyramids and Cones 11-4 Volumes of Prisms and Cylinders 11-5 Volumes of Pyramids and Cones 11-6 Surface Areas and Volumes of Spheres 11-7 Areas and Volumes of Similar Solids	G-GMD.4 G-MG.1 G-GMD.1 G-GMD.2 G-GMD.3 G-MG.2	Chapter 11	
8-14	**Circles** 12-1 Tangent Lines 12-2 Chords and Arcs 12-3 Inscribed Angles 12-4 Angle Measures and Segment Lengths 12-5 Circles in the Coordinate Plane 12-6 Locus: A Set of Points	G-C.2 G-C.3 G-C.4 G-GPE.1 G-GMD.4	Chapter 12	
9-16	**Probability** 13-1 Experimental and Theoretical Probability 13-2 Probability Distributions and Frequency Tables 13-3 Permutations and Combinations 13-4 Compound Probability and Probability of Multiple Events 13-5 Probability Models 13-6 Conditional Probability Formulas	S-CP.1 S-CP.4 S-CP.5 S-CP.9 S-CP.7 S-CP.8 S-CP.2 S-CP.3 S-CP.6 S-MD.6 S-MD.7	Chapter 13	

	13-7 Modeling Randomness			

C. HONORS COURSES ONLY
Indicate how much this honors course is different from the standard course.

D. BACKGROUND INFORMATION
Context for course (optional)
History of Course Development (optional)