ARCHITECTURE & CONSTRUCTION DESIGN GEOMETRY
Course Syllabus

<table>
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<tr>
<th>Course Number:</th>
<th>Sand Springs course #</th>
<th>OHLAP Credit:</th>
<th>No</th>
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<tbody>
<tr>
<td>OCAS Code:</td>
<td>None</td>
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<tr>
<td>Course Length:</td>
<td>150 Hours</td>
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<td>Career Cluster:</td>
<td>Architecture &amp; Construction</td>
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<td>Career Pathway:</td>
<td>Construction</td>
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<td>Career Major(s):</td>
<td>Construction Academy</td>
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Course Description:
This course is the study of basic geometric terms, postulates, theorems and formulas. Students will learn to solve problems and prove theorems through both deductive and inductive reasoning. This course is designed to be in preparation for Algebra II.

Textbooks:
Prentice Hall Geometry: Randall I. Charles, Basia Hall, Dan Kennedy, Laurie E. Bass, Art Johnson, Siegfried Haenisch, Stuart J. Murphy, Grant Wiggins; 2011

Course Objectives:

Standard 1: Logical Reasoning
The student will use deductive and inductive reasoning to solve problems.

1. Identify and use logical reasoning skills (inductive and deductive) to make and test conjectures, formulate counter examples, and follow logical arguments.
2. State, use, and examine the validity of the converse, inverse, and contrapositive of “if-then” statements.
3. Compare the properties of Euclidean geometry to non-Euclidean geometries (for example, elliptical geometry, as shown on the surface of a globe, does not uphold the parallel postulate).

Standard 2: Properties of 2-Dimensional Figures
The student will use the properties and formulas of geometric figures to solve problems.

1. Use geometric tools (for example, protractor, compass, straight edge) to construct a variety of figures.
2. Line and Angle Relationships
   a. Use the angle relationships formed by parallel lines cut by a transversal to solve problems.
   b. Use the angle relationships formed by two lines cut by a transversal to determine if the two lines are parallel and verify, using algebraic and deductive proofs.
   c. Use relationships between pairs of angles (for example, adjacent, complementary, vertical) to solve problems.
3. Polygons and Other Plane Figures
   a. Identify, describe, and analyze polygons (for example, convex, concave, regular, pentagonal, hexagonal, n-gonal).
   b. Apply the interior and exterior angle sum of convex polygons to solve problems, and verify using algebraic and deductive proofs.
c. Develop and apply the properties of quadrilaterals to solve problems (for example, rectangles, parallelograms, rhombi, trapezoids, kites).

d. Use properties of 2-dimensional figures and side length, perimeter or circumference, and area to determine unknown values and correctly identify the appropriate unit of measure of each.

4. Similarity
   a. Determine and verify the relationships of similarity of triangles, using algebraic and deductive proofs.
   b. Use ratios of similar 2-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference, and area.

5. Congruence
   a. Determine and verify the relationships of congruency of triangles, using algebraic and deductive proofs.
   b. Use the relationships of congruency of 2-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference, and area.

6. Circles
   a. Find angle measures and arc measures related to circles.
   b. Find angle measures and segment lengths using the relationships among radii, chords, secants, and tangents of a circle.

Standard 3: Triangles and Trigonometric Ratios

The student will use the properties of right triangles and trigonometric ratios to solve problems.

1. Use the Pythagorean Theorem and its converse to find missing side lengths and to determine acute, right, and obtuse triangles, and verify using algebraic and deductive proofs.

2. Apply the 45-45-90 and 30-60-90 right triangle relationships to solve problems, and verify using algebraic and deductive proofs.

3. Express the trigonometric functions as ratios and use sine, cosine, and tangent ratios to solve real-world problems.

4. Use the trigonometric ratios to find the area of a triangle.

Standard 4: Properties of 3-Dimensional Figures

The student will use the properties and formulas of geometric figures to solve problems.

1. Polyhedra and Other Solids
   a. Identify, describe, and analyze polyhedra (for example, regular, decahedral).
   b. Use properties of 3-dimensional figures; side lengths, perimeter or circumference, and area of a face; and volume, lateral area, and surface area to determine unknown values and correctly identify the appropriate unit of measure of each.

2. Similarity: Use ratios of similar 3-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference of a face, area of a face, and volume.

3. Create a model of a 3-dimensional figure from a 2-dimensional drawing and make a 2-dimensional representation of a 3-dimensional object (for example, nets, blueprints, perspective drawings).

Standard 5: Coordinate Geometry

The student will solve problems with geometric figures in the coordinate plane.
1. Find the distance between two points; the midpoint of a segment; and calculate the slopes of parallel, perpendicular, horizontal, and vertical lines.

2. Properties of Figures
   a. Given a set of points determine the type of figure formed based on its properties.
   b. Use transformations (reflection, rotation, translation) on geometric figures to solve problems within coordinate geometry.

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures: 1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

Description of Classroom, Laboratories, and Equipment: Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.

Available Certifications/College Credit: The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility: The student must maintain a grade point average of 2.0 or better.