Course Outline
Geometry

The course outline includes all of the modules and all of the topics that are covered in each module. In addition, 2016 Virginia Standards of Learning are indicated in the appropriate column below.

Geometry Scope and Sequence		
Module and Topic	**Name**	**2016 Virginia Standards of Learning**
Student Resources: *The purpose of this module is to review skills that students need in order to be successful in other areas of the course.*		
Module 1: Logic and Reasoning		
Topic 1	Conditional and Biconditional Statements	G.1 The student will use deductive reasoning to construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include a) identifying the converse, inverse, and contrapositive of a conditional statement; and c) determining the validity of an argument.
Topic 2	Translating Verbal Arguments into Symbolic Form	G.1 The student will use deductive reasoning to construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include b) translating a short verbal argument into symbolic form.
Topic 3	Inductive and Deductive Reasoning	G.1 The student will use deductive reasoning to construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include c) determining the validity of a logical argument.
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines		
Topic 1	Angle Relationships	G.2 The student will use the relationships between angles formed by two lines intersected by a transversal to b) solve problems, including practical problems, involving angles formed when parallel lines are intersected by a transversal.
Topic 2	Practical Problems Involving Angles	G.2 The student will use the relationships between angles formed by two lines intersected by a transversal to b) solve problems, including practical problems, involving angles formed when parallel lines are intersected by a transversal.
Topic 3	Using Angle Relationships to Prove Lines are Parallel	G.2 The student will use the relationships between angles formed by two lines intersected by a transversal to a) prove two or more lines are parallel.
Module 3: Lines		
Topic 1	The Distance Formula	G.3 The student will solve problems involving symmetry and transformation. This will include a) investigating and using formulas for determining distance, midpoint and slope.

Topic 2	The Midpoint Formula	G.3 The student will solve problems involving symmetry and transformation. This will include a) investigating and using formulas for determining distance, midpoint and slope.
Topic 3	Slopes of Parallel and Perpendicular Lines	G.3 The student will solve problems involving symmetry and transformation. This will include a) investigating and using formulas for determining distance, midpoint and slope; and b) applying slope to verify and determine whether lines are parallel or perpendicular.
Module 4: Symmetry and Transformations		
Topic 1	Translations	G.3 The student will solve problems involving symmetry and transformation. This will include d) determining whether a figure has been translated, reflected, rotated, or dilated using coordinate methods.
Topic 2	Reflections	G.3 The student will solve problems involving symmetry and transformation. This will include d) determining whether a figure has been translated, reflected, rotated, or dilated using coordinate methods.
Topic 3	Rotations	G.3 The student will solve problems involving symmetry and transformation. This will include d) determining whether a figure has been translated, reflected, rotated, or dilated using coordinate methods.
Topic 4	Symmetry	G.3 The student will solve problems involving symmetry and transformation. This will include c) investigating symmetry and determining whether a figure is symmetric with respect to a line or a point.
Topic 5	Dilations	G.3 The student will solve problems involving symmetry and transformation. This will include d) determining whether a figure has been translated, reflected, rotated, or dilated using coordinate methods.
Module 5: Triangle Relationships		
Topic 1	Ordering the Sides and Angles of a Triangle	G.5 The student, given information concerning the lengths of sides and/or measures of angles in triangles, will solve problems, including practical problems. This will include a) ordering the sides by length, given angle measures; and b) ordering the angles by degree measure, given side lengths.
Topic 2	Triangle Existence	G.5 The student, given information concerning the lengths of sides and/or measures of angles in triangles, will solve problems, including practical problems. This will include c) determining whether a triangle exists.

Topic 3	Determining the Range of the Length of the Third Side of a Triangle	G.5 The student, given information concerning the lengths of sides and/or measures of angles in triangles, will solve problems, including practical problems. This will include d) determining the range in which the length of the third side must lie.
Module 6: Congruent and Similar Triangles		
Topic 1	Triangle Congruence: SSS and SAS	G.6 The student, given information in the form of a figure or statement, will prove two triangles are congruent.
Topic 2	Triangle Congruence: ASA and AAS	G.6 The student, given information in the form of a figure or statement, will prove two triangles are congruent.
Topic 3	Triangle Congruence: HL	G.6 The student, given information in the form of a figure or statement, will prove two triangles are congruent.
Topic 4	Using Direct Proofs to Prove Triangles Congruent	G.6 The student, given information in the form of a figure or statement, will prove two triangles are congruent.
Topic 5	Triangle Similarity: SSS, SAS, and AA	G.7 The student, given information in the form of a figure or statement, will prove two triangles are similar.
Topic 6	Using Direct Proofs to Prove Triangles Similar	G.7 The student, given information in the form of a figure or statement, will prove two triangles are similar.
Module 7: Right Triangles		
Topic 1	The Pythagorean Theorem and Its Converse	G.8 The student will solve problems, including practical problems, involving right triangles. This will include applying a) the Pythagorean Theorem and its converse.
Topic 2	Special Right Triangles	G.8 The student will solve problems, including practical problems, involving right triangles. This will include applying b) properties of special right triangles.
Topic 3	Right Triangle Trigonometry	G.8 The student will solve problems, including practical problems, involving right triangles. This will include applying c) trigonometric ratios.
Topic 4	Practical Problems Involving Right Triangles	G.8 The student will solve problems, including practical problems, involving right triangles. This will include applying a) the Pythagorean Theorem and its converse; b) properties of special right triangles; and c) trigonometric ratios.
Module 8: Quadrilaterals		
Topic 1	Parallelograms	G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems.
Topic 2	Rectangles	G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems.
Topic 3	Rhombi	G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems.

Topic 4	Squares	G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems.
Topic 5	Trapezoids and Isosceles Trapezoids	G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems.
Topic 6	Using Direct Proofs to Prove the Properties of Quadrilaterals	G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems.
Module 9: Polygons		
Topic 1	Interior Angles of Polygon	G.10 The student will solve problems, including practical problems, involving angles of convex polygons. This will include determining the a) sum of the interior and/or exterior angles; and b) measure of an interior and/or exterior angle.
Topic 2	Exterior Angles of a Polygon	G.10 The student will solve problems, including practical problems, involving angles of convex polygons. This will include determining the a) sum of the interior and/or exterior angles; and b) measure of an interior and/or exterior angle.
Topic 3	Applications Involving Angle Measures of Polygons	G.10 The student will solve problems, including practical problems, involving angles of convex polygons. This will include determining the a) sum of the interior and/or exterior angles; b) measure of an interior and/or exterior angle; and c) number of sides of a regular polygon.
Module 10: Circles		
Topic 1	Angles Formed by Intersections in the Interior and Exterior of a Circle	G.11 The student will solve problems, including practical problems, by applying properties of circles. This will include determining a) angle measures formed by intersecting chords, secants, and/or tangents.
Topic 2	Central and Inscribed Angles	G.11 The student will solve problems, including practical problems, by applying properties of circles. This will include determining a) angle measures formed by intersecting chords, secants, and/or tangents.
Topic 3	Segment Lengths	G.11 The student will solve problems, including practical problems, by applying properties of circles. This will include determining b) lengths of segments formed by intersecting chords, secants, and/or tangents.
Topic 4	Arc Length and Area of a Sector	G.11 The student will solve problems, including practical problems, by applying properties of circles. This will include determining c) arc length; and d) area of a sector.
Topic 5	Practical Problems Involving Circles	G.11 The student will solve problems, including practical problems, by applying properties of circles. This will include determining a) angle measures formed by intersecting chords, secants, and/or tangents; b) lengths of segments formed by intersecting chords, secants, and/or tangents;

		c) arc length; and d) area of a sector.
Topic 6	Equation of a Circle	G.12 The student will solve problems involving equations of circles.
Module 11: Constructions		
Topic 1	Constructions Involving Line Segments and Perpendicular Lines	G.4 The student will construct and justify constructions of a) a line segment congruent to a given line segment; b) the perpendicular bisector of a line segment; c) a perpendicular to a given line from a point not on the line; and d) a perpendicular to a given line at a given point on the line. G.6 The student, given information in the form of a figure or statement, will prove two triangles are congruent. G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems. G11 The student will solve problems, including practical problems, by applying properties of circles. This will include determining a) angle measures formed by intersecting chords, secants, and/or tangents; and b) lengths of segments formed by intersecting chords, secants, and/or tangents.
Topic 2	Constructions Involving Angles and Parallel Lines	G.2 The student will use the relationships between angles formed by two lines intersected by a transversal to a) prove two or more lines are parallel. G.4 The student will construct and justify constructions of e) the bisector of a given angle; f) an angle congruent to a given angle; and g) a line parallel to a given line through a point not on the line. G.6 The student, given information in the form of a figure or statement, will prove two triangles are congruent. G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems.
Topic 3	Constructions Involving Figures Inscribed in Circles	G.4 The student will construct and justify constructions of h) an equilateral triangle, a square, and a regular hexagon inscribed in a circle. G.9 The student will verify and use properties of quadrilaterals to solve problems, including practical problems. G11 The student will solve problems, including practical problems, by applying properties of circles. This will include determining a) angle measures formed by intersecting chords, secants, and/or tangents; and

		b) lengths of segments formed by intersecting chords, secants, and/or tangents.
Module 12: Perimeter, Area, and Volume		
Topic 1	Cylinders and Prisms	G.13 The student will use surface area and volume of three-dimensional objects to solve practical problems.
Topic 2	Pyramids and Cones	G.13 The student will use surface area and volume of three-dimensional objects to solve practical problems.
Topic 3	Spheres and Hemispheres	G.13 The student will use surface area and volume of three-dimensional objects to solve practical problems.
Topic 4	Practical Problems Involving Three-Dimensional Figures	G.13 The student will use surface area and volume of three-dimensional objects to solve practical problems.
Topic 5	Similarity in Two- and Three-Dimensional Figures	G.14 The student will apply the concepts of similarity of two- or three-dimensional geometric figures. This will include a) comparing ratios between lengths, perimeters, areas, and volumes of similar figures; b) determining how changes in one or more dimensions of a figure affect area and/or volume of the figure; c) determining how changes in area and/or volume of a figure affect one or more dimensions of the figure; and d) solving problems, including practical problems, about similar geometric figures.