Geometry/Block – Foundations

COURSE DESCRIPTION: As a logical and reasoning discipline, Geometry has a distinctive function within mathematics curricula. Having a deep understanding of geometric principles and techniques will help us to overcome many obstacles in learning whole mathematics in a progressive way. Geometry Course is crafted with such an idea in mind. Providing students with the basics of reasoning and inquiry skills, and exposing them to the real nature of geometry is the backbone of this course. Structure of the course developed for enhancing skills needed for critical thinking and decision making processes; deep engagement in the content of this course will lead students to streamlines tactics and strategies needed in dealing with sophisticated problems. By studying this course, students can climb to an efficient level of mathematical retention and analytical competency.

COURSE OBJECTIVES:

- Apply the theorems associated with quadrilaterals.
- Identify the properties of squares.
- Identify the properties of rectangles.
- Identify the properties of parallelograms.
- Identify quadrilaterals as parallelograms.
- Identify the properties of rhombi.
- Identify the properties of trapezoids.
- Identify the properties of polygons
- Calculate the angle measures of polygons.
- Form ratios in simplest form.
- Apply proportions to solve problems.
- Identify similar figures.
- Apply the Similarity Postulates to show two triangles are similar.
- Identify similar quadrilaterals.
- Identify similar polygons.
- Identify parts of a circle.
- Apply the theorems related to arcs, chords, diameters, and tangents.
- Identify and apply the properties of central angles.
- Identify and apply the properties of inscribed angles.
- Identify and apply the properties of tangent-chord angles.
- Write equations of circles with center at the origin and a radius r.

- Write equations of circles with a center at (a, b) and a radius r.
- Calculate sine, cosine, tangent, and cotagent ratios.
- Identify and apply trigonometric ratios.
- Find the angles and sides of right triangles.
- Apply the Law of Sines.
- Apply the Law of Cosines.
- Calculate the area of a triangle.
- Calculate the perimeter of a triangle.
- Calculate the area of a polygon.
- Calculate the perimeter of a polygon.
- Calculate the area and perimeter of a square.
- Calculate the area and perimeter of a rectangle.
- Calculate the area and perimeter of a parallelogram.
- Calculate the area and perimeter of a rhombus.
- Calculate the area and perimeter of a trapezoid.
- Calculate the circumference of a circle.
- Calculate the area of a circle.
- Calculate the surface area of a prism.
- Calculate the surface area of a cylinder.
- Calculate the surface area of a pyramid.
- Calculate the surface area of a cone.
- Calculate the surface area of a sphere.
- Calculate the volume of a prism.
- Calculate the volume of a cylinder.
- Calculate the volume of a pyramid.
- Calculate the volume of a cone.
- Calculate the volume of a sphere
- Apply translations.
- Apply reflections.
- Apply rotations.

PREREQUISITES: None

COURSE LENGTH: Two Semesters

REQUIRED TEXT: No required textbook for this course.

MATERIALS LIST: No required materials for this course.

COURSE OUTLINE:

Unit 1: Connections From Algebra

- Points, Lines, and Planes
- Measuring Segments
- Rays and Angles
- Classifying Angles
- Pairs of Angles
- Right Angles and Perpendicular Lines

Unit 2: Reasoning and Introduction to Proof

- Inductive Reasoning
- If-Then, Converses, and Postulates
- Deductive Reasoning
- Properties from Algebra and Proof
- Two-Column Proof with Segments and Angles

Unit 3: Parallel Lines and Coordinate Plane

- Lines and Points in a Plane
- Lines and Points in Coordinate Plane
- Equations of Lines in Coordinate Plane

Unit 4: Triangles: Basic Closed Figures in Geometry

- Structure of Triangles
- Congruent Triangles and Congruence Tests
- Special Segments in Triangles

Unit 5: Special Triangles and Special Relationships in Triangles

- Isosceles Triangles
- Equilateral Triangles

- Right Triangles and Pythagorean Theorem
- Triangle Inequalities

Unit 6: Quadrilaterals and Polynomials
- Squares and Rectangles
- Parallelograms
- The Rhombus and Trapezoids
- Polygons
- Unit Exam

Unit 7: Similarity
- Ratios and Proportions
- Similar Figures
- Similar Quadrilaterals and Polygons
- Unit Exam

Unit 8: Circles
- Arcs and Special Segments
- Special Angles in Circles
- Equations of Circles
- Unit Exam

Unit 9: Right Triangles and Trigonometry
- Special Ratios in Right Triangles
- Law of Sines and Cosines
- Unit Exam

Unit 10: Perimeter and Area
- Perimeter and Area of Triangles and Polygons
- Perimeter and Area of Quadrilaterals
- Circumference and Area of a Circle
- Surface Area
- Volume
- Transformations

- Unit Exam