**Honors Geometry—M481**

**Full Year (9, 10)—1 credit—rank weight 1.05**

**Prerequisite:** Honors Algebra with at least an 85% final average or Algebra Regents with at least a 95% and teacher recommendation; mastery on Common Core Algebra Regents

**Topics of study include:**

**Congruence, Proof, and Constructions**

 Basic Constructions—equilateral triangle, copy and bisect angles, perpendicular bisectors, points of concurrency

 Unknown Angles—angles and lines at a point, parallel lines, triangle sum theorem, proof writing, proofs with constructions, proofs of known facts

 Transformations/Rigid Motions—rotations, line reflections, symmetry, translations, points on a perpendicular bisector, compositions, congruence in terms of rigid motion, correspondence and transformations

 Triangle Congruence—SAS, base angles of isosceles triangles, ASA, SSS, AAS, HL, proof writing

 Geometric Figures—parallelograms, special lines in triangles

 Advanced Constructions—square, 9-point circle

 Axiomatic Systems

**Similarity, Proof, and Trigonometry**

 Scale Drawings—ratio method, parallel method

 Dilations—transformations, to map segments, to map lines/rays/circles, to map angles, from different centers

 Similarity and Dilations—why, properties, similarity, AA, between and within figure ratios, SAS, SSS, angle bisector theorem, families of parallel lines

 Similarity in Right Triangles—dividing into two similar sub-triangles, radicals, Pythagorean Theorem proof through similarity

 Trigonometry—useful rations, sine, cosine, tangent, cofunctions, solving problems with sine and cosine, tangent, Pythagorean Theorem, area, finding side length, laws of sines and cosines, finding angles

**Three Dimensions**

 Area—properties, scaling principles, area of a disk

 Volume—3-D space, prisms and cylinders and cross-sections, pyramids and cones and cross-sections, volume, scaling for volume, sphere

**Connecting Algebra and Geometry Through Coordinates**

 Rectangular and Triangular Regions Defined by Inequalities—searching a region, systems of inequalities, lines through regions

 Perpendicular and Parallel Lines—criterion for perpendicularity, right angles, normal, parallel and perpendicular lines

 Perimeters and Areas of Polygonal Regions—perimeter and area of triangles/polygons/areas defined by inequalities

 Partitioning and Extending Segments and Parameterization of Lines—divide segments proportionally, analytic proofs, distance from appoint to a line

**Circles**

 Central and Inscribed Angles—Thales’ Theorem, chords/relationships,, rectangles inscribed in circles, inscribed angles

 Arcs and Sectors—angle measure of an arc, arcs and chords, arc length and area of sector

 Secants and Tangents—properties, tangent segments, inscribed angles/tangent angles, secant lines, interior angles, exterior angles, similar triangles

 Equations of Circles and Their Tangents—write equation, recognize equations, equations for tangent lines to circles

 Cyclic Quadrilaterals—Ptolemy’s Theorem, cyclic quadrilaterals

Note: Geometry students will take the NYS Common Core Geometry Examination in June. This regents exam will be the final examination for the course.

Assessment: Students will take a district-wide exam at the end of the 2nd quarter and the NY Common Core Geometry Exam in June.