# 4/26/2023

# brcc keystone logo

Baton Rouge Community College

*Academic Affairs Master Syllabus*

Date Approved: 4 May 2023

Term and Year of Implementation: Fall 2023

**Course Title:** Geometry for Elementary and Middle School Teachers

**BRCC Course Rubric:** MATH 1683

**Previous Course Rubric**: MATH 168

**Lecture Hours per week-Lab Hours per week-Credit Hours**: 3-0-3

**Per semester: Lecture Hours-Lab Hours-Instructional Contact Hours**: 45-0-45

**Louisiana Common Course Number:** CMAT 1423

**CIP Code:** 13.1311

**Course Description:** Designed to prepare the student to teach the geometry of the K-8 curriculum. Topics include basic concepts and properties of two- and three-dimensional space; perimeter, area, volume, parallelism, perpendicularity, congruence, similarity, transformations and constructions.

**Prerequisites:** Appropriate placement test score or MATH 1113 (or MATH 101) or MATH 1213 (or MATH 110) with a grade of C or better

**Co-requisites:** None

**Suggested Enrollment Cap:** 20

**Learning Outcomes.** *Upon successful completion of this course, the students will be able to:*

1. Demonstrate the ability to recognize, classify, sort, and order objects by size, number, and other properties.

2. Identify, compare, and analyze attributes of two- and three dimensional shapes and develop vocabulary to describe the attributes.

3. Examine the congruence, similarity, and line or rotational symmetry of objects using transformations.

4. Make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions

5. Select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision.

6. Demonstrate a fundamental understanding of both metric and customary systems of measurements and the need for measuring with standard units.

7. Demonstrate the ability to carry out simple unit conversions such as centimeters to meters, within a system of measurement.

8. Develop and use formulas to find the area of rectangles and related triangles and parallelograms, the circumference of circles, and the area of trapezoids and circles. Develop strategies to find the area of more complex shapes.

9. Use two-dimensional objects to visualize and solve problems such as those involving surface area and volume.

10. Recognize and create shapes that have symmetry.

11. Recognize and apply geometric ideas and relationships in areas outside the mathematics classroom, such as art, science, and everyday life.

**Assessment Measures.** Assessment of all learning outcomes will be measured using the following methods:

1. Instructor created exams and or homework

2. A comprehensive departmental final exam

**Information to be included on the Instructor’s Course Syllabi:**

* ***Disability Statement*:** Baton Rouge Community College seeks to meet the needs of its students in many ways. See the Office of Disability Services to receive suggestions for disability statements that should be included in each syllabus.
* ***Grading:*** The College grading policy should be included in the course syllabus. Any special practices should also go here. This should include the instructor’s and/or the department’s policy for make-up work. For example in a speech course, “Speeches not given on due date will receive no grade higher than a sixty” or “Make-up work will not be accepted after the last day of class”.
* ***Attendance Policy*:** Include the overall attendance policy of the college. Instructors may want to add additional information in individual syllabi to meet the needs of their courses.
* ***General Policies*:** Instructors’ policy on the use of things such as beepers and cell phones and/or hand held programmable calculators should be covered in this section.
* ***Cheating and Plagiarism*:** This must be included in all syllabi and should include the penalties for incidents in a given class. Students should have a clear idea of what constitutes cheating in a given course.
* ***Safety Concerns:*** In some courses, this may be a major issue. For example, “No student will be allowed in the lab without safety glasses”. General statements such as, “Items that may be harmful to one’s self or others should not be brought to class”.
* ***Library/ Learning Resources:*** Since the development of the total person is part of our mission, assignments in the library and/or the Learning Resources Center should be included to assist students in enhancing skills and in using resources. Students should be encouraged to use the library for reading enjoyment as part of lifelong learning.

**Expanded Course Outline:**

I. Geometric Shapes

A. Recognizing Geometric Shapes and Definitions

1. line segment, angle, right angle, perpendicular

2. triangle(scalene, isosceles, equilateral)

3. quadrilateral (rectangle, square, parallelogram, kite, rhombus, trapezoid, isosceles trapezoid)

B. Analyzing Shapes

1. lines of symmetry; Mira

2. rotational symmetry

3. perpendicular and parallel lines; folding tests

4. more on quadrilaterals: the attributes of the quadrilaterals listed in part c. above

5. regular polygons

6. angles of polygons: vertex, central, exterior

7. convex; concave

8. the circle

C. Properties of Geometric Shapes: Lines and Angles

1. point, line, plane

2. collinear points, parallel lines, betweenness

3. measuring angles: degrees, protractor, acute, right, obtuse

4. lines and angles: transversals, alternate interior angles, corresponding angles

5. angle sum in a triangle

D. Regular Polygons and Tessellations

1. angle measures in a regular polygon (n-gon)

2. tessellations with regular n-gons

E. Describing Three Dimensional Shapes

1. Planes, skew lines, dihedral angles

2. Polyhedra: (faces, edges, vertices, bases, lateral faces, etc.)

1. prisms

2. pyramids

3. platonic solids and Euler’s formula

3. right cylinder and right cylinder cone

II. Measurement.

A. Measurement with Nonstandard and Standard Units

1. English system: quantities, units and conversions

2. Metric system: quantities, units and conversions

a. Dimensional analysis

B. Length and Area

1. definition of perimeter and circumference

2. areas; square, triangle, parallelogram, trapezoid, circles, a proof of the Pythagorean Theorem using areas

3. triangle inequality

C. Surface Area {Emphasis on areas of faces, not formulas}

1. surface area, bases, lateral surface area

2. right prisms and right cylinders

3. right pyramids and right circular cones

4. spheres

D. Volume {Emphasis on general principals, not formulas}

1. right rectangular prism, right prisms in general, and right cylinder

2. right pyramid and right circular cones

3. sphere

III. Geometry Using Triangle Congruence and Similarity

A. Congruence of Triangles

1. notions of congruence and correspondence

2. SAS, ASA, SSS

B. Similarity of Triangles

C. Basic Euclidean Constructions

1. copying: line segment, angle

2. bisecting: line segment, angle

3. perpendicular line: to a given line through a point on/off the line respectively

4. parallel line: to a given line through a point not on the line

D. Additional Euclidean Constructions

1. Construction packet: angle bisectors and incenter, perpendicular bisectors and circumcenter, etc.

E. Transformations Isometries (rigid motions of the plane) to be defined, and then performed using folding paper, trading paper, dot paper

1. Translation

2. Rotation

3. Reflection

4. glide reflection

i. Size transformations (magnification, dilations)

ii. Congruence and Similarity Using Transformations

iii. LOGO