Math 1144: Mathematics for Elementary School Teachers II

Credit hours: **4 credit hours**
Prerequisites: **Math 1143 with a grade of C or better**

Course Description

A continuation of MATH 1143, this course includes geometry and measurement, counting problems, probability, and statistics. This class is equivalent to Math 144 at RIC.

Course Objectives

1. Provide students with a thorough and rigorous foundation in geometry and measurement, probability, and problem solving
2. Achieve a deeper and more meaningful understanding of the underlying structure of elementary mathematics
3. Learn to communicate the nuance of mathematics to an elementary level audience

Learning Outcomes

1. Explore the basic elements of geometry, including line segments, rays, angles, parallel lines and associated angle pairs, as well as the measure of these concepts
2. Classify triangles, quadrilaterals, and regular polygons both by side and angle measures
3. Determine the area and perimeter of triangles, rectangles, parallelograms, trapezoids, and circumference of circles, with an understanding of the inter-relationship between the formulas. Heron's formula will be used for finding the area of a triangle knowing its three sides
4. Explore the basic elements of geometry, including line segments, rays, angles, parallel lines and associated angle pairs, as well as the measure of these concepts
5. Define solids such as prisms, pyramids, cylinders, cones, and spheres and determine the surface area and volume for each of these structures. Students will utilize Euler's formula for polyhedron and draw nets for three dimensional figures
6. Use the Cartesian coordinate system to illustrate how shapes can be moved and how the motions relate to coordinate geometry and symmetry
7. Organize, represent, and interpret data by creating stem and leaf and scatter plots, as well as dot plots, line graphs, bar graphs and pie charts
8. Compute and interpret measures of central tendency, standard deviation, and z-scores
9. Compute experimental and theoretical probabilities using the rules of probability and counting techniques, as well as odds
10. Solve probability problems involving the fundamental counting principle, permutations, and combinations

Course Topics

I. GEOMETRICAL SHAPES
   A. Lines, planes, and angles
   B. Triangles
   C. Quadrilaterals, polygons, and circles
   D. Surfaces and solids

II. MEASUREMENT
- A. Length and measurement process
- B. Perimeter and area
- C. Surface area
- D. Volume
- E. Other measures*

III. CONGRUENCE, SIMILARITY, AND CONSTRUCTIONS
- A. Congruent shapes
- B. Similar shapes
- C. Basic geometrical constructions*
- D. Constructing shapes*

IV. COORDINATE AND TRANSFORMATION GEOMETRY
- A. Coordinate geometry
- B. Transformations
- C. Congruence, similarity, and symmetry with transformations
- D. Geometric patterns*

V. STATISTICAL THINKING
- A. Formulating questions and collecting data
- B. Representing and analyzing data with statistical graphs
- C. Representing and analyzing data with descriptive statistics
- D. Abuses of statistics*

VI. PROBABILITY
- A. Experimental probability and making predictions from data
- B. Theoretical probability
- C. Conditional and geometric probability, odds, and expected value
- D. Counting techniques

*Optional as time allows