

# SYLLABUS

**COURSE # AND TITLE:** Math 215, Mathematics for Elementary and Middle School Teachers  
**# OF CREDITS:** 3

## CATALOG DESCRIPTION:

A development of the properties, concepts, and logical reasoning of geometry. Topics include analysis of geometric shapes, measurement, triangle congruence and similarity, basic Euclidean constructions, coordinate geometry, transformations, and tessellations.

**Semester Offered:** Fall, Spring  
**Prerequisites:** Grade of "C" or better in Math 121

### *Common Student Learning Outcomes*

*Upon successful completion of San Juan College programs and degrees, the student will....*

<i>Learn</i>	<i>Students will actively and independently acquire, apply and adapt skills and knowledge to develop expertise and a broader understanding of the world as lifelong learners.</i>
<i>Think</i>	<i>Students will think analytically and creatively to explore ideas, make connections, draw conclusions, and solve problems.</i>
<i>Communicate</i>	<i>Students will exchange ideas and information with clarity and originality in multiple contexts.</i>
<i>Integrate</i>	<i>Students will demonstrate proficiency in the use of technologies in the broadest sense related to their field of study.</i>
<i>Act</i>	<i>Students will act purposefully, reflectively, and respectfully in diverse and complex environments.</i>

## GENERAL LEARNING OBJECTIVES

Upon completion of this course, the student should have a working knowledge of the following content areas:

- 1.) Geometric Shapes and Tessellations
- 2.) Measurement
- 3.) Triangle Congruence and Similarity & Basic Euclidean Constructions
- 4.) Coordinate Geometry
- 5.) Transformations

## SPECIFIC LEARNING OUTCOMES

Upon successful completion of the course, the student will be able to ...

- 1.1) Explain the van Hiele theory with respect to the five levels of geometrical reasoning
- 1.2) Recognize two-dimensional geometric shapes that would result from paper folding, and then cutting
- 1.3) Define and measure the following types of angles: right, obtuse, acute, straight, and reflex
- 1.4) Determine supplementary, complementary, and alternate interior angles
- 1.5) Define and determine parallel, perpendicular, and concurrent lines
- 1.6) Define and recognize the two-dimensional geometric shapes by their properties such as number of sides and/or types of angles
- 1.7) Understand congruence and apply these properties to geometric shapes
- 1.8) Use reflection and rotation symmetries to determine if a pair of two or three dimensional objects are identical

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- 1.9) Determine if a two or three dimensional object is convex or concave
- 1.10) Define and determine the properties and tessellations of a regular polygon
- 1.11) Define and recognize polyhedron and other three dimensional objects by their properties
  
- 2.1) Calculate distance, perimeter, area, surface area, volume, mass and temperature of objects in standard and metric units
- 2.2) Estimate distance, perimeter, area, surface area, and volume of objects in common standard and metric units
- 2.3) Convert within and between standard and metric units using dimensional analysis
- 2.4) Calculate the circumference, diameter, and radius of a circle
- 2.5) Calculate the surface area, volume, diameter and radius of a sphere
- 2.6) Use the Pythagorean Theorem to solve geometrical problems involving triangles and diagonals
  
- 3.1) Define congruent triangles and use their properties to solve problems
- 3.2) Prove or disprove congruence of triangles using the SSS, SAS, and ASA properties of congruent triangles
- 3.3) Use the congruence property of opposite sides and angles of a parallelogram to solve problems
- 3.4) Define similar triangles and use their properties to solve problems
- 3.5) Perform basic Euclidean constructions using a compass, protractor and straight edge
  
- 4.1) Use Cartesian plane coordinates to find the distance between two points, perform a collinearity test on three points, find the midpoint between two points, and the slope of the line formed from two points
- 4.2) Determine if two lines are collinear, parallel or perpendicular using the slopes of the lines
- 4.3) Find the equation of line using the slope-intercept form and the point-slope form
- 4.4) Find the solution of a system of two linear equations graphically and algebraically
- 4.5) Find the equation of a circle
- 4.6) Find the centroid and orthocenter of a triangle
  
- 5.1) Perform the isometric transformations of translations, rotations, reflections, and glide reflections
- 5.2) Identify translation, rotation, reflection, and glide reflection symmetries in an object
- 5.3) Create a Escher-type pattern
- 5.4) Create size transformations
- 5.5) Perform a similitude transformation
- 5.6) Use the properties of congruence, isometry, size transformations, similitude, and similarity to solve problems

At the discretion of the instructor, other objectives may be added.

Additional requirements of the course: Graphing Calculator, TI-83, TI-83 Plus, or TI-84 Plus required.

Dean  Date 2-12-08

**A current syllabus must be on file in the dean's office for every course being taught during a given semester.**