

**University of Arkansas – Fort Smith
5210 Grand Avenue
P. O. Box 3649
Fort Smith, AR 72913–3649
479–788–7000**

General Syllabus

MATH 22373 Geometry and Measurement I

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisite: MATH 13473 Number Sense II

Effective Catalog: 2018~2019

I. Course Information

A. Catalog Description

Students study the connections among geometric and measurement ideas and the instantiation of pedagogical methods used by current practitioners at the Kindergarten through 6th grade level. The mathematical content domains involve Arkansas Math Standards concepts associated with geometry, probability, statistics, measurement, NCTM standards, and technology.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

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

1. Draw significant connections between knowledge of geometric mathematical domains and age appropriate pedagogical methodologies that lead to significant K through 6 student knowledge.
2. Create age appropriate mathematical learning plans that engage all students using the common core process and content standards.
3. Use proper geometric notation.
4. Convert units of linear measure.
5. Identify and categorize triangles, quadrilaterals, and other polygons based on their attributes and the hierarchy among selected polygons.
6. Measure, construct, and identify angles.
7. Perform constructions based on the properties and attributes of triangles and quadrilaterals using a compass and straightedge Geometer's Sketchpad and/or other software.
8. Determine when triangles and other figures are congruent.

9. Determine when triangles and other figures are similar.
10. Identify parts of a circle and their relationships.
11. Complete a project/presentation/lesson involving K-6 Geometric content which integrates the practices and domains from the Arkansas Math Standards.

B University Learning Outcomes

This course enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will identify problems and develop and justify solutions to problems by researching, evaluating and comparing information from varying sources. Students will recognize geometry as a tool for dealing with space relations. Students to apply analytic techniques in identifying possible solutions to problems drawn from a wide variety of areas.

Quantitative Reasoning

Students will interpret and/or draw inferences regarding quantitative relations through data, sampling, and statistics and probability concepts as well as spatial concepts such as linear measure, area, volume, and among a variety of shapes in varying dimensions. Students will apply appropriate statistical and mathematical models to solve problems along with representing information symbolically, visually, numerically, and verbally. Students will interpret models and data in order to draw inferences and recognize the limitations of quantitative analysis.

Communication Skills (written and oral)

Students will communicate proficiently by composing coherent documents appropriate for elementary students, teachers, and administrators. Students will communicate effectively in a public setting while demonstrating examples or sharing relevant research and information in statistics, probability, or geometry.

III Major Course Topics

- A. K through 6 Mathematics Pedagogy
 1. Use of manipulatives for conceptual understanding
 2. Standards of Mathematical Practice
- B. Basic Notations and Terms in Geometry
 1. Importance of vocabulary
 2. Importance of symbol usage
 3. Foundational terms such as point, line, plane, and angle
- C. Triangles, Quadrilateral, and other Polygons
 1. Types of triangles based on sides and angles
 - a. Isosceles triangles have AT LEAST two congruent sides
 2. Properties of special quadrilaterals
 - a. Hierarchy for quadrilaterals and how it has recently changed
 - b. Trapezoid has AT LEAST 1 pair of parallel sides
 3. Names of polygons up to 12 sides
 4. Convex vs. concave

D. Constructions

1. Copy angles, segments, triangles
2. Bisect angles, segments
3. Parallel and perpendicular lines to a given line through a given point
4. Centers of triangles

E. Angles

1. Types of angles
2. Measure and create angles of a given measure
3. Angle relationships: supplementary, complementary, vertical
4. Angles formed by parallel lines cut by a transversal
5. Sum of the measures of the interior and exterior angles of regular and irregular polygons

F. Congruence

1. Basic definition using corresponding parts of 2 polygons
2. Triangle congruence theorems: SAS, SSS, ASA, SAA, HL, LL, HA

G. Similarity

1. Basic definition
2. Relationship to congruence
3. Triangle similarity theorems: SSS, SAS, AA

H. Circles

1. Name parts of circles
2. Calculate circumference and area
3. Calculate arc length and sector area