MISSOURI WESTERN STATE UNIVERSITY

COLLEGE OF LIBERAL ARTS AND SCIENCES

DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS, AND PHYSICS

COURSE NUMBER: MAT 353

COURSE NAME: Mathematics for Elementary and Middle School Teachers II

COURSE DESCRIPTION:

Introductory geometry; geometric constructions; measurement geometry; motion geometry; introductory probability and statistics.

PREREQUISITE:

Grade of C or better in MAT 352. (Not applicable to the major or minor in mathematics.)

TEXT:

New Elementary Math: Syllabus D1-W/GDE Pkg., Meng, Edition Rev 10, Singaporem
ISBN 9789812714114
Primary Mathematics 3B, 4A, 5A, 5B, 6B
Elementary Geometry F/Teachers, Parker, Edition 08, Singaporem, ISBN 9780974814056

COURSE OBJECTIVE:

The objective of the MAT 352/353 course sequence is to provide prospective elementary and middle school teachers with the mathematical knowledge that they will need to teach mathematics in the elementary or middle school.

STUDENT COMPETENCIES:

In order to meet the above objective, successful students will:

1. Communicate mathematics accurately and clearly.
2. Use geometric terminology and notation accurately.
3. Determine angle measures analytically by applying relevant theorems.
4. Perform geometric constructions using straight edge and compass.
5. Apply congruence theorems in informal and formal geometric proofs.
6. Apply properties of similar triangles.
7. Apply the Pythagorean Theorem.
8. Find perimeter and area of two-dimensional figures using both metric and English units.
9. Find volume and surface area of three-dimensional figures using both metric and English units.

10. Perform geometric transformations.
11. Compute probabilities for single- and multi-stage experiments.
12. Apply various counting techniques.
13. Communicate statistics graphically.
14. Compute and interpret measures of central tendency and variation.

COURSE OUTLINE:

I. Probability
   - A. How Probabilities Are Determined
   - B. Multistage Experiments with Tree Diagrams and Geometric Probabilities
   - C. Using Simulations in Probability
   - D. Odds and Expected Value
   - E. Methods of Counting

II. Statistics: An Introduction
   - A. Statistical Graphs
   - B. Measures of Central Tendency and Variation
   - C. Abuses of Statistics

III. Introductory Geometry
   - A. Basic Notions
   - B. Polygons
   - C. More About Angles
   - D. Geometry in Three Dimensions

IV. Constructions, Congruence, and Similarity
   - A. Congruence Through Constructions
   - B. Other Congruence Properties
   - C. Other Constructions
   - D. Similar Triangles and Similar Figures
   - E. Lines in a Cartesian Coordinate System

V. Concepts of Measurement
   - A. Linear Measure
   - B. Areas of Polygons and Circles
   - C. The Pythagorean Theorem
   - D. Surface Areas
   - E. Volume, Mass, and Temperature

IV. Motion Geometry and Tessellations
   - A. Translations and Rotations
   - B. Reflections and Glide Reflections
   - C. Size Transformations
   - D. Symmetries