math217 Syllabus

Math 217: Geometry and Measurement For PK-8 Teachers

Text: *Math 217,* by Pat Jones ISBN: 1-935435-07-8

Prerequisites: Completion of MATH 117 with a grade of C or better. Restriction: Education majors only.

Course Description:
This course features applications of measurement and geometry with a focus on understanding and explaining mathematical concepts. Systems of measurement, plane figures, properties of polygons, three dimensional figures, area and perimeter, volume and surface area, geometric patterns, estimation, problem solving, and number concepts are integrated and presented within real world situations.

This content in this course aligns with that of K-8 schools, giving prospective teachers the knowledge of mathematics that they will need to effectively teach the CCSS content. Also, an emphasis is placed on the Standards for Mathematical Practice as described in the CCSS, allowing prospective teachers to experience what their future K-8 students will experience. Prospective teachers enrolled in this course are expected to:
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriately tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Course Outcomes:
Students will learn: How important concepts can be developed in a smooth progression, giving special attention to significant mathematics and cognitive transitions;
How the Big Ideas are rooted and interconnected in real-world contexts, and how they can be modeled using familiar objects and situations;
How number sense, spatial sense, intuition, and problem-solving permeate everything;
That reasoning and ordinary language are essential components of concept development.

Instructional Methods:
Visual aids such as charts and drawings are presented to help the students grasp the mathematical concepts. A wide variety of techniques, approaches, and appropriate tools will be used as students are encouraged to solve problems in different ways. Emphasis is placed on the students' ability to express "in writing" how they solve various types of problems and how they know that the answer is correct. Manipulatives will be used to model mathematical topics and create geometric figures.

Calculator:

Students are allowed to use calculators when it is appropriate. Students are also expected to use the methods developed in Math 117 to do some calculations mentally and well as incorporating these methods in pencil and paper work.

Sections and Topics

- What is measurement?
- Length: inches, half-inches, quarter-inches
- Weight: pounds, ounces
- Liquid Capacity: cup, pint, quart, gallon
- Familiar Units: yards, degrees Fahrenheit, feet, tablespoons, liters, etc
- Perimeter
- More Units: Mile, fluid ounce
- Metric Units: centimeter, meter
- Metric Units: millimeter, kilometer
- More Metric Units: gram and kilogram
- More Metric Units: milliliters, milligrams
- More Metric Units: Celsius
- Segments, lines, rays
- Circles
- Angles
- Shortest Distance from a Point to a Line
- Parallels
- Polygons
- Area
- Regular polygons
- Angle Sum Theory
- Area of Circles
- Area of Sectors
- Right Triangles, Pythagorean Theorem
- Cubes
- Volume of rectangular box
- Similarity
- Prisms, Pyramids
- Cylinders, Cones
- Prisms, Pyramids, Cylinders, Cones