

**Departmental Syllabus**  
**Math 3030 – Mathematics for Educators III**

**Textbooks:**

*Mathematics for Elementary School Teachers*, 2nd Edition by P. O’Daffer, R. Charles, T. Cooney, J. Dossey, J. Schielack. Addison-Wesley, 2002.

*Teaching and Learning Elementary and Middle School Mathematics*, 5<sup>th</sup> Edition by L.J. Sheffield and D.E. Cruikshank. Wiley, 2005.

**Prerequisites:** MATH 2030 with a grade of "C" or better.

**Course Description:** Math 3030 is the third semester in a three-semester sequence of integrated content and methods courses for preservice teachers. It is open only to students in elementary education pursuing certification levels B – 11 or 10 – 14. (The course is not intended for students pursuing certification level 10 – 21.) Topics covered include names, properties, and relationships of two- and three-dimensional shapes; spatial sense; transformations including rotations, reflections, and translations; coordinate geometry; concepts of measurement including measurable attributes, standard and non-standard units, precision and accuracy, use of appropriate tools, the structure of systems of measurement; measurement including length, area, volume, size of angles, weight, mass, and temperature; indirect measurement and its uses, including developing formulas; formal and informal argument. Throughout the course, students will be expected to explain their reasoning using appropriate vocabulary and notation.

**Test-out Policy:** Math 3030 is an integrated content and methods course for preservice teachers. Much of the content material will be embedded in in-class activities that model a variety of teaching methods. As a result, students will be actively involved in doing mathematics during the class period. Because of the significant amount of in-class participation, a student will not be allowed to test out of this course.

**Topics to be covered:**

**Introductory Geometry** – In this unit we introduce some of the foundational language and concepts of geometry. Since problem solving is a large component of our three courses, this unit will also incorporate problem solving with the geometry topics. Students will be expected to explain their reasoning using appropriate vocabulary and notation.

- Basic Language, Notions and Illustrations of Geometric Concepts
  - Points, Lines, and Planes
  - Angles
- Two-Dimensional Geometric Figures and their Properties
  - Triangles and Quadrilaterals
  - Circles
- Three-Dimensional Geometric Figures and their Properties
- Congruencies
- Networks
- Spatial Visualization

**Measurement** – In this unit we develop the concept of measurement. Included throughout will be discussion of the precision and reasonableness of the obtained measure. Students will be expected to explain their measurements using appropriate vocabulary and notation.

- Basic Facts, Principles, and Techniques of Measurement
  - Arbitrary and Standard Units
  - Conversions of Units Within a System and Between Systems
  - Selection, Reading, and Interpretation of Measuring Instruments
- Direct and Indirect Measurement of one, two, and three dimensions
  - Direct Measure with Standard Tools of length, weight (mass), temperature, time, and liquid capacity
  - Estimating a measure of an irregular shape
  - Develop Formulas for Perimeter/Circumference, Area, Surface Area and Volume
- Angles and Triangles
  - Pythagorean Relationships/Special Right Triangles
  - Sum of Angles
  - Triangle Inequality
  - Trigonometric Relationships

**Constructions** – In this unit we discuss geometric constructions made by using a compass and a straightedge. Students will be expected to justify their constructions using appropriate vocabulary and notation.

- Congruency, Similarity, and Proportionality
- Basic Constructions
  - Angles and Triangles
  - Segments
  - Parallel and Perpendicular Lines
  - Bisectors
  - Inscribed Polygons

**Motion Geometry** – In this final unit we explore motion geometry. In addition to identifying the various types of motion geometry, students will be asked to physically construct them as well. Students will be expected to explain their work using appropriate vocabulary and notation.

- Isometries (Translations, Rotations, Reflections, and Glide Reflections)
- Size Transformations (Ratio, Proportion, Scale Factors, Distortion)
- Symmetries
- Tessellations
- Paper Folding
- Coordinate Representations