Math 106 - Concepts and Structures of Elementary Mathematics II

1. **Course Description**
   - This continuation of MATH 105 covers the mathematical concepts needed for teaching elementary school mathematics. Core topics include the real number system, geometry, Pythagorean theorem, measurement in both the English and metric systems, transformations, and symmetry. Students must demonstrate their understanding of the concepts and structures of elementary mathematics using critical thinking. UC CREDIT LIMITATION: Credit for MATH 105 or MATH 106.
2. **Topics Covered**
   - This course is designed to reinforce mathematical concepts for those wanting to teach grades K-8. There is an emphasis on geometry and measurement. The goal of most of these students is to obtain their Multiple Subject Teaching Credential.
3. **What to expect?**
   - Costs: There will usually be a required textbook and activities manual. This may vary by instructor.
   - Time: The most common term lengths are listed below; others would be proportionate. Outside of class time is studying, completing homework, reviewing, etc.

Length of term	In-class time	Out-of-class time (typical)	Total hours/wk (typical)	Total Term hours (typical)
17 weeks	5 hrs/wk	4 hrs/wk	9	153

   - Format: The course is taught as a combined lecture/lab format where there is time in class to work through activities and/or sample problems together.
   - Grading: The lecture and lab components are combined so the lab portion will not have a separate grade. The course may be taken with a letter grade or Pass/No Pass.
4. **Who should enroll?**
   - Students that want to teach grades K-8 or students who would like to learn more about the content and procedures in elementary school. The emphasis is on learning and understanding higher mathematical ideas. The content is college level material related to concepts for elementary school.
   - This course has a prerequisite of Math 105 (Concepts and Structures of Elementary Mathematics I).
5. **What prior knowledge students need to know to be successful?**
   - Successful completion of MATH 105
   - Knowledge of math fundamentals
     i. Addition, subtraction, multiplication, division, exponents, and inverse operations of whole numbers, natural numbers, integers, fractions, rationals, and real numbers.
     ii. Understanding traditional algorithms for arithmetic operations on the number sets listed above.
     iii. Inequality knowledge ($<$, $>$, $\leq$, $\geq$,)
     iv. Being able to conclude that an answer does or does not make sense.
   - Geometry Knowledge

i. Knowing the terms perimeter, area, and volume as well as basic geometric terms like triangle, square, rectangle, etc.
ii. Comfortable using formulas with multiple variables.

- Linear equations
  i. Solving linear equations in one variable like y = mx + b.
  ii. Solving linear equations.
  iii. Be able to graph a line and interpret points on a graph.
  iv. Find the slope of a line and intercepts and interpret the meaning in words.
  v. Be familiar with the Cartesian coordinate system.
- Quadratic Equations
  i. Solving quadratic equations in one variable like $ax^2 + bx + c = 0$