Math 105 - Concepts and Structures of Elementary Mathematics I

1. **Course Description**
   - This course covers set theory, problem solving, systems of numeration, elementary number theory, numerical operations, and arithmetic algorithms. It emphasizes cognitive learning and the development of problem solving strategies and techniques. Students work collaboratively in groups and/or independently using manipulatives and models to explore structures and formulate concepts. 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 numeric concepts; sets, logic, counting numbers, integers, rational numbers, real numbers, and some number theory. The goal of many 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 and need a transfer level course. The emphasis is on learning and understanding higher mathematical ideas. The content is college level material related to concepts for elementary school.
   - This course is a prerequisite for Math 106 (Concepts and Structures of Elementary Mathematics II).
5. **What prior knowledge students need to know to be successful?**
   - 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 ($<, >, \leq, \geq, \neq$)
     iv. Being able to conclude that an answer does or does not make sense.

- Geometry Knowledge
  i. Knowing the terms perimeter, area, and volume.
  ii. Be comfortable using formulas with multiple variables.
- Linear equations
  i. Be able to solve linear equations.
  ii. Be familiar with the Cartesian coordinate system.
  iii. Be able to graph a line and interpret points on a graph.
  iv. Be able to find the slope of a line and intercepts and interpret the meaning in words.
- Quadratic Equations
  i. Be able to solve quadratic equations in one variable like $ax^2 + bx + c = 0$.