Administrative Unit: Computer and Mathematical Sciences Department
Course Prefix and Number: MATH 115
Course Title: Mathematics for the Elementary School Teacher
Number of Credit Hours: 3 Lecture Hours: 3 Laboratory Hours: 0
Catalog Description: This course is designed to help pre-service elementary school teachers develop a conceptual framework for mathematics, especially for those aspects normally experienced in elementary school. Through their work in the course the students study the main themes of mathematics throughout the curriculum, considering both mathematical and pedagogical content issues in teaching mathematics. Topics include sets, logic, informal geometry, numeration systems, properties of real numbers and an introduction to probability and statistics. Prerequisites: Grade of C or better in MATH 104, or a score of 21 or above on the math portion of the ACT or a passing score on the math placement exam. Offered Spring.
Prerequisite(s)/Corequisite(s): Grade of C or better in MATH 104, or a score of 21 or above on the math portion of the ACT or a passing score on the math placement exam.
Text(s): Most current editions of the following:
Course Objectives:
• To understand and demonstrate confidence in personal ability to do mathematics.
• To become a persistent and successful mathematical problem solver.
• To learn to reason and justify mathematically.
• To learn to communicate mathematically.
• To become an independent learner.
• To learn to read mathematics for understanding.
• To understand the role of language and precision in mathematics, in particular, the importance of defining mathematical terms.
• To learn to choose and use representations (verbal, symbolic, visual, material, manipulative, technological) to enhance mathematical understanding.
• To understand and master the topics of sets, sets of numbers and their structure, geometry and constructions, systems of numerations, probability statistics, and logic.

Measurable Learning Outcomes:
• Explain the concepts of whole numbers, integers, fractions, real numbers, ratio, proportion, and percent.
• Demonstrate the usual and some alternative algorithms for operations on whole numbers, fractions, decimals, integers, and real numbers.
• Justify and use estimation procedures.
• Illustrate the relations of equality and inequality with whole numbers, integers, rational numbers, and real numbers.
• Apply basic number theory concepts to problem situations.
• Organize and interpret data.
• Calculate measures of central tendency and dispersion.
• Solve problems involving probability.
• Apply basic counting techniques to problem situations.
• Identify and analyze 2- and 3-dimensional geometric figures.
• Calculate 2- and 3-dimensional measurements of geometric figures.
• Measure in the metric and customary units.
• Justify the similarity or congruency of figures.
• Make basic geometric constructions with pencil, straight-edge, and compass.
• Demonstrate knowledge of the skills required for problem solving.
• Use a variety of manipulatives to develop number and concepts, geometric concepts, spatial relationships, and probability.
• Use technology (calculator and computer) as a learning and teaching tool for mathematics.

Topical Outline (major areas of coverage):
• Problem Solving
• Elementary Logic
• Basic Set Theory
• Whole Numbers and Numeration
• Operations with Whole Numbers (Addition, Subtraction, Multiplication and Division), including the use of Mental Math, Estimation, Calculators and Written Algorithms
• Primes, Composites, and Tests for Divisibility
• Factors, Greatest Common Factor, and Least Common Multiple
• The Set of Fractions and operations with fractions
- Decimals and Operations with Decimals
- Integers and Operations with Integers
- The Real Number System
- Collecting, Organizing, Picturing, and Analyzing Data
- Basic Probability, including Simple and Complex Experiments
- Counting Techniques, including the combinations and permutations
- Recognizing and analyzing 2-dimensional and 3-dimensional Geometric Shapes
- Lines and Angles
- Regular Polygons
- Measurement with Nonstandard and Standard Units
- Length and Area
- Surface Area and Volume
- Congruence and Similarity of Triangles
- Basic Euclidean Constructions

Recommended maximum class size for this course: **30**

Library Resources: Online databases are available at [http://www.ccis.edu/offices/library/resources.asp](http://www.ccis.edu/offices/library/resources.asp). You may access them from off-campus using your services login and password when prompted.

Prepared by:  

Ann Bledsoe  
Name  
Signature  

Date:  March 8, 2006  

**NOTE:** The intention of the master syllabus is to provide an outline of the contents of this course, as specified by the faculty of Columbia College, regardless of who teaches the course, when it is taught or where it is taught. Faculty members teaching this course for Columbia College are expected to facilitate learning pursuant to the course objectives and cover the subjects listed in the topical outline. However, instructors are also encouraged to cover additional topics of interest so long as those topics are relevant to the course’s subject. The master syllabus is, therefore, prescriptive in nature but also allows for a diversity of individual approaches to course material.

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