CALIFORNIA STATE UNIVERSITY, SACRAMENTO
Department of Mathematics and Statistics

SYLLABUS

Math 107A and 107B:**Fundamental Mathematical Concepts**
3 units each

Prerequisites: Math 107A - Math 17 and passing score on the Intermediate Diagnostic exam within one semester of enrollment in Math 107A

Math 107B - pass Math 107A with a grade of C- or better.

May not be taken for credit toward a math major or minor.

The focus of this course is the students' mastery of specific mathematical content which is substantially more than that contained in the K-8 curriculum. The students will examine the structure and basic properties of the real number system and its subsystems. They will also examine fundamental concepts and properties in geometry and measurement.

Various methods of instruction will be used, with a problem-solving approach providing the general basis. Historical and multi-cultural perspectives will be interwoven through the course. Appropriate materials and calculators will be used as often as possible.

Math 107A topics:

Logic
Logical statements, connectives, converse, contrapositive, methods of proof

Pre-Number Concepts
Attributes, classification, sets, ordering, patterns, realtions, and functions

Natural Number System
Development of from counting sets, development of addition and multiplication

Whole Number System
Extension of N to W, historical role of number systems, base ten, place value and its relations to grouping in operation, properties of the basic operation, estimation, calculator use, geometric representation of whole numbers (number line)

Integers
Extension of W to Z, models for integers, extension of operations, properties, divisability, greatest common divisor, least common multiple, division algorithm, Euclidean algorithm, primes, composites, unique factorization, divisibility criteria

Explorations in Elementary Geometry
Basic concepts and properties of two and three-dimensional Euclidan space (including alternate interior angles, vertical angles, angles inscribed in a semicircle, angle sums of plygons, similar triangles, congruent triangles,

Pythagorean theorem) using paper folding , geoboards, mirrors, tiles, models, etc.

Measurement

Process of measurement (selection of a unit, covering with the unit, counting the number of units used, etc.); application of measuring using standard and non-standard units of length, area, volume, capacity, mass and their relationships; estimation of measures; perimeter, area and volume of standard geometric figures; indirect measurement (similar figures, Pythagorean theorem, etc.).

Math 107B topics:

Rational Number System

Extension of Z to Q, models for rational numbers (fractional form), ope rations, properties, decimal representation.

Real Number System

Irrationality of p2, irrational numbers, extension of Q to R, operations, properties, relation of types of real numbers to forms of decimal expansions, density and approximation via decimal expansions, rounding and truncating on a calculator, ratio, proportion, percentage, completeness of R.

Geometry

Properties of circles and related segments and lines, similarity, congruence, development of ð and its use in circumference and area problems, tessellations, regular polyhedra; aesthetic and cultural aspects, history of geometry, types of geometry (Euclidean, non-Euclidean geometries, topology), geometry in nature, transformations (translations, rotations, reflections, and their compositions), isometries, development and application of mensuration formulas.

Reviewed Fall 1995