Math 1101 Introduction to Mathematical Modeling

DESCRIPTION: This course is suggested as an alternative to College Algebra. This course should be applications-driven by introducing functions using real-world phenomena as models. Ability to communicate quantitative concepts and critical thinking should be developed. Appropriate use of technology should be used to solve problems and to judge reasonableness of results. However, technology should be used to enhance the course and should not become the main focus of instruction.

THEMES: Throughout the course it is expected that content will be presented using multiple approaches—numerical, graphical, symbolic, and verbal. The concept of a function should be approached all four ways. In addition, both discrete and continuous data should be used.

A. Review Topics. Upon entering College Algebra, the student is expected to possess an understanding of Elementary and Intermediate Algebra. At MOST 20% of class time will be spent reviewing the following topics in order to reinforce the students' understanding of them.
   1. Sets and Set Operations
   2. Special Products and Factoring
   3. Fundamental Operations with Polynomial and Rational Expressions
   4. Integral and Rational Exponents and Radicals
   5. Linear Equations in One Unknown with Applications
   6. Linear Inequalities in One Unknown
   7. Quadratic Equations in One Unknown
   8. Rectangular Coordinates and Graphs of First- and Second- Degree Equations
   9. System of Two Linear Equations in Two Unknowns
   10. Ratio and Proportion

B. Uniform Requirements. Between 50% and 70% of class time will be spent on the following topics:
   1. Functions
   2. Linear Models of Real-World Phenomena
   3. Quadratic Models of Real-World Phenomena
   4. Polynomial Models of Real-World Phenomena
   5. Exponential Models of Real-World Phenomena
   6. Logarithmic Models of Real-World Phenomena

C. Additional Topics. Even though each of the following areas is appropriately placed under the title "Introduction to Mathematical Modeling", it would be unrealistic to expect that they would be covered in a minimum level Introduction to Mathematical Modeling course. However, between 10% and 50% of class time will be spent covering three or more of these areas:
   1. Piecewise-Defined Models of Real-World Phenomena
   2. Inverse of a Function
   3. Composition of Functions
   4. Matrices
   5. Systems of Linear Equations
   6. Trigonometric Models of Real-World Phenomena
   7. Counting Principles
   8. Linear Programming
   9. Variation
   10. Basic Probability Concepts
   11. Basic Statistical Concepts

For suitable textbooks, please consult the texts spreadsheet on the ACMS website.