Course Title: MTH 161: PreCalculus I

Course Description
Presents topics in power, polynomial, rational, exponential, and logarithmic functions and systems of equations and inequalities. Lecture 3 hours per week. 3 credits.

General Course Purpose
The general purpose of this one-semester course is to prepare students for a course in statistics or applied calculus sequence by providing them with the necessary competencies in algebra and functions. Precalculus I can also be applied in conjunction with Precalculus II in preparation for a course in calculus with analytic geometry.

Course Prerequisites/Corequisites
Prerequisite: Satisfaction or completion of units MTE 1-9 or Corequisite: MCR 6, which requires the satisfaction of any 7 of the 9 MTE units.

Course Objectives
Upon completing the course, the student will be able to:

Relations and Functions
- Distinguish between relations and functions.
- Evaluate functions both numerically and algebraically.
- Determine the domain and range of functions in general, including root and rational functions.
- Perform arithmetic operations on functions, including the composition of functions and the difference quotient.
- Identify and graph linear, absolute value, quadratic, cubic, and square root functions and their transformations.
- Determine and verify inverses of one-to-one functions.

Polynomial and Rational Functions
- Determine the general and standard forms of quadratic functions.
- Use formula and completing the square methods to determine the standard form of a quadratic function.
- Identify intercepts, vertex, and orientation of the parabola and use these to graph quadratic functions.
- Identify zeros (real-valued roots) and complex roots, and determine end behavior of higher order polynomials and graph the polynomial, and graph.
- Determine if a function demonstrates even or odd symmetry.
- Use the Fundamental Theorem of Algebra, Rational Root test, and Linear Factorization Theorem to factor polynomials and determine the zeros over the complex numbers.
- Identify intercepts, end behavior, and asymptotes of rational functions, and graph.
- Solve polynomial and rational inequalities.
- Interpret the algebraic and graphical meaning of equality of functions (f(x) = g(x)) and inequality of functions (f(x) > g(x))

Exponential and Logarithmic Functions
- Identify and graph exponential and logarithmic functions and their transformations.
- Use properties of logarithms to simplify and expand logarithmic expressions.
- Convert between exponential and logarithmic forms and demonstrate an understanding of the relationship between the two forms.
- Solve exponential and logarithmic equations using one-to-one and inverse properties.
- Solve application problems involving exponential and logarithmic functions.

Systems of Equations and Inequalities
- Solve three variable linear systems of equations using the Gaussian elimination method.

Major Topics to be Included
Relations and Functions
Polynomial and Rational Functions
Exponential and Logarithmic Functions
Systems of Equations and Inequalities

(To be completed by VCCS)