Tennessee Technological University
Mathematics Department

MATH 1130: College Algebra

I. COURSE DESCRIPTION FROM CATALOG:

Review of algebra and coordinate geometry; function; polynomial, rational, exponential, and logarithmic functions; systems of equations; binomial formula; counting (multiplication principle, permutations, and combinations); conics. Credit towards graduation will not be given for MATH 1130 and MATH 1710 or for MATH 1130 and MATH 1730. Lec. 3. Cr. 3.

II. PREREQUISITE(S):

A minimum ACT Math sub-score of 19 or SAT Math sub-score of 460 or COMPASS Algebra score of 38, OR completion of Learning Competencies 1 through 5, OR a minimum grade of C in MATH 1000.

III. COURSE OBJECTIVE(S):

Build on (not replicate) the competencies gained through the study of two years of high school algebra and one year of high school geometry. Use mathematics to solve problems and determine if the solutions are reasonable. Use mathematics to model real world behaviors and apply mathematical concepts to the solution of real-life problems. Make meaningful connections between mathematics and other disciplines. Use technology for mathematical reasoning and problem solving. Apply mathematical and/or basic statistical reasoning to analyze data and graphs. Refine the algebraic skills, geometric skills, and reading comprehension skills of students needed in academic areas that require college algebra as a terminal course in mathematics.

IV. STUDENT LEARNING OUTCOMES:

Upon successful completion of this course the student will manipulate both numeric and algebraic expressions; solve various types of algebraic equations and inequalities; distinguish between relations and functions and create graphs by hand of a variety of functions; compute the solution to a system of equations both graphically and algebraically, and interpret the corresponding result.

V. TOPICS TO BE COVERED:

Review of Algebra Basics (from MATH 1000)

- Laws of exponents
- Operations on polynomial expressions
- Linear equations
- Factoring Basics
    - Expressions
    - Solving equations
- Rational Expressions and Equations
    - Domain
    - Operations and simplifying
- Radicals and Rational Exponents
    - Definitions of radicals and rational exponents
    - Operations and simplifying expressions
- Functions and Relations
    - Definitions
    - Linear relations
    - Notation and evaluation

Non-linear Expressions, Equations, Inequalities, and Functions

- Quadratic Equations and Functions
  - Completing the square
  - Solving quadratic equations
  - Quadratic functions
    - Forms
    - Graphing
  - Circles
- Rational Equations
  - Solving equations involving rational expressions
- Radicals and Rational Exponents
  - Solving equations involving radical expressions
- Functions
  - Common parent functions
  - Function algebra
    - Operations
    - Composition
    - One-to-one functions
    - Inverse functions
  - Transformation of parent functions
- Polynomial functions
  - Forms
    - General form
    - Factored form
  - Graphing
  - Rewriting general form to factored form
    - Polynomial division
    - Linear factor theorem
    - Rational zero theorem
    - Complex numbers
    - Fundamental theorem of algebra
- Rational functions
  - End behavior
    - Horizontal asymptote
    - Oblique asymptote
  - Middle behavior
    - Vertical asymptote
    - Hole
  - Graphing
- Inequalities
  - Solutions
  - Linear inequalities
  - Quadratic and polynomial inequalities
  - Rational inequalities
- Exponential and logarithmic functions
  - Exponential functions
    - Definition
    - Natural exponential function
    - Graphs
  - Logarithmic functions
    - Definition
    - Natural logarithmic function
    - Graphs

    - Logarithm properties
    - Exponential and logarithmic equations
- Systems of Linear Equations
    - Two variable
    - Three variable

Topics if time permits

- Conics
    - Parabola
    - Ellipse
    - Hyperbola
- Sequences and Series
    - Definition and notation
    - Arithmetic
    - Geometric
    - Binomial Theorem

VI. POSSIBLE TEXT AND REFERENCES:

College Algebra – A Concise Approach, Paul Sisson
Associated online component - *Hawkes Learning System*

VII. STUDENT ACADEMIC MISCONDUCT POLICY:

Maintaining high standards of academic integrity in every class at Tennessee Tech is critical to the reputation of Tennessee Tech, its students, alumni, and the employers of Tennessee Tech graduates. The Student Academic Misconduct Policy describes the definitions of academic misconduct and policies and procedures for addressing Academic Misconduct at Tennessee Tech. For details, view the Tennessee Tech's Policy 217 – Student Academic Misconduct at Policy Central.

VIII. DISABILITY ACCOMMODATION:

Students with a disability requiring accommodations should contact the Office of Disability Services (ODS). An Accommodation Request (AR) should be completed as soon as possible, preferably by the end of the first week of the course. The ODS is located in the Roaden University Center, Room 112; phone 372-6119. For details, view the Tennessee Tech's Policy 340 – Services for Students with Disabilities at Policy Central.