Course Code: MTH401

Course Description: This is the first of two Web-enabled courses designed to provide students with the necessary preparation for studying calculus and other college mathematics courses. This course reviews algebraic properties and then introduces functions and graphs. As students continue with the course, they will learn about algebraic and inverse functions, exponential and logarithmic functions, conic sections, matrices, determinants, complex numbers, and discrete algebra. Throughout the course, they will discover examples of the role of mathematics in daily life.

Course Outline:

Unit 1-- Fundamentals of Algebra

Lesson 1 -- Sets and Real Numbers

Lesson 2 -- Equations

Lesson 3 -- Cartesian Coordinates

Unit 2-- Functions

Lesson 1 -- Functions

Lesson 2 -- Graphing

Lesson 3 -- Algebra of Functions

Unit 3-- Linear and Quadratic Functions

Lesson 1 -- Linear Functions
Lesson 2 -- Quadratic Functions and Graphs
Lesson 3 -- Conic Sections

Unit 4-- Polynomial and Rational Functions

Lesson 1 -- Polynomial Functions

Lesson 2 -- Polynomial Roots

Lesson 3 -- Rational Functions

Unit 5-- More Functions and Systems of Equations

Lesson 1 -- Exponents/Logarithms

Lesson 2 -- Systems of Equations

Lesson 3 -- Matrices/Determinants

Unit 6-- Complex Numbers and Discrete Algebra

Lesson 1 -- Complex Numbers

Lesson 2 -- Sequences and Sums

Lesson 3 -- Binomial Theorem

Course Objectives:

- Graph simple functions and use their properties to analyze additional types of functions.
- Combine functions algebraically and find composite and inverse functions.
- Identify the properties of linear, quadratic, and rational functions and their graphs.
- Identify the equations, properties, and graphs of conic sections.

- Find functional values, factors, and roots of polynomial functions and sketch their graphs.
- Use the properties of exponential and logarithmic functions to solve problems and sketch graphs.
- Solve and graph systems of equations.
- Solve and graph problems involving inequalities.
- Solve and use matrices and determinants.
- Use complex numbers to solve problems.
- Use summation notation, sequences, and the binomial theorem to evaluate expressions.
- Recognize and use basic processes of combinations, permutations, and probability.
- Use mathematical induction to prove equations involving summation notation.

Number/Description of Projects, Exams, Activities, etc.:

- **6 Notebook Assignments -** Each unit contains a notebook assignment based on content covered in that unit. The questions require students to expand on various aspects of the content through discussion and/or exploration external to the course. Students are referred to an online discussion group or given World Wide Web links to begin their exploration.

- **6 Evaluations -** At the end of each unit there is a Unit Evaluation. The evaluations vary by unit in the number of questions by unit but contain only multiple-choice questions.

- **Midterm and Final Evaluations -** There is a Midterm Evaluation to be completed after the Unit 3 Evaluation and the Midterm Review. There is also a Final Evaluation to be completed after the Unit 6 Evaluation and the Final Review. The Final Evaluation covers content from Units 4, 5, and 6.

Materials: All course materials have been approved for district use.

Timelines & Methods for evaluating student progress: Students are expected to log in daily and submit assignments on a weekly basis. Progress will be evaluated each month based progress towards assignment completion of assignments.

This course meets state and district graduation requirements in the area of Algebra.

Weekly contact will be conducted through a submitted assignment with instructor feedback. Students who do not submit an assignment are expected to email or call his/her instructor.

Each student is expected to spend a minimum of five hours per week on this course. Additional hours may be necessary to complete the course successfully.

Beginning & end date