**Eastern WV Community & Technical College**
**Master Course Record**

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| **Course Prefix and Number:** MTH 135 |
| **Course Title:** College Algebra |
| **Recommended Transcript Title** (if over 40 characters) College Algebra |
| **Date Approved/Revised**: 7/15/13; 10/13/14; 10/13/16; 10/5/17 |
| **Credit Hours:** 3<br>**Contact hours per week (Based on 15 week term):**<br>**Lecture:** 3<br>**Lab:** |
| **Prerequisite:** Math ACT score 19 or higher; SAT math score 500 or higher; or ACCUPLACER Elementary Algebra score of 76 or higher.<br>**Corequisite:** MTH 135S if required by placement.<br>**Pre/Corequisite:** |
| **Grading Mode:** Letter Grade |
| **Catalog Description:** College Algebra covers the following topics: systems of equations, theory and application of matrices, theory of equations and inequalities, complex numbers, graphs of relations and functions, theory and application of exponential and logarithmic functions, and mathematical modeling of data. |
| **Course Outcomes:**<br>1. Evaluate and analyze functions<br>2. Graph linear and nonlinear functions<br>3. Solve linear equations and inequalities<br>4. Solve absolute value equations and inequalities<br>5. Solve quadratic equations and inequalities<br>6. Analyze polynomials and solve polynomial equations and inequalities<br>7. Solve rational equations and inequalities<br>8. Solve problems involving exponential and logarithmic functions<br>9. Solve systems of equations and inequalities |
| **Implementation Cycle:** Fall and Spring semesters |
| **Role in College Curriculum: (Check all that apply)**<br>X **General Education Core:** Mathematics<br>□ **Technical Core**<br>□ **Restricted Elective**<br>□ **General Elective**<br>□ **Workforce Education**<br>□ **Other** |
| **Course Fee:** None |
| **Instructor's Qualifications:** Master's Degree with 18 graduate level mathematics credits |
| **Expanded Course Description:** |

This course will focus on problem solving skills; mathematical modeling applications; development of the student's ability to think mathematically; and preparation of the student for future math and science courses. Course delivery may be via a traditional or an online classroom. Instruction is reinforced with online tutorial labs or other activities.

Expanded Course Outcomes:

1. Evaluate and analyze functions
    a. Classify real numbers
    b. Find the domain and range of a relation
    c. Define function
    d. Identify functions
    e. Recognize function notation and evaluate functions
    f. Find the domain and range of a function
    g. Write inequalities in interval and set-builder notation
    h. Recognize where a function is increasing and where it is decreasing
    i. Perform operations on functions
    j. Perform composition of functions
    k. Define and identify a one-to-one function
    l. Find the inverse of a one-to-one function symbolically and graphically
2. Graph linear and nonlinear functions
    a. Write the equation of a line
    b. Calculate the distance between two points
    c. Find the midpoint of two points
    d. Graph a circle from its equation
    e. Graph linear functions
    f. Identify the x- and y-intercepts of a linear function
    g. Find the slope of the line between two points
    h. Write an equation of a line
    i. Evaluate piecewise functions
    j. Graph piecewise functions
    k. Graph horizontal and vertical lines and give their slope
    l. Identify parallel and perpendicular lines
    m. Analyze the graph of a quadratic function
    n. Convert a quadratic function between vertex form and standard form
    o. Graph quadratic functions
    p. Graph functions using transformations
3. Solve linear equations and inequalities
    a. Solve variation problems
    b. Solve linear equations
    c. Solve linear equations graphically

d. Solve an equation for a specified variable
e. Solve linear inequalities

4. Solve absolute value equations and inequalities
5. Solve quadratic equations and inequalities
    a. Solve quadratic equations by factoring
    b. Solve quadratic equations using the square root property
    c. Solve quadratic equations by completing the square
    d. Solve quadratic equations using the quadratic formula
    e. Use the discriminant to determine the number and type of solutions to a quadratic equation
    f. Perform operations with complex numbers
    g. Solve quadratic inequalities
6. Analyze polynomials and solve polynomial equations and inequalities
    a. Determine whether a function is a polynomial
    b. Identify the degree of a polynomial
    c. Identify the leading coefficient of a polynomial
    d. Locate the extrema of a function
    e. Identify a turning point of a function
    f. Describe the graph of a polynomial based on its degree and leading coefficient
    g. Divide polynomials using long division
    h. Divide polynomials using synthetic division
    i. Recognize the connection among $x$-intercepts, zeros, and factors of a polynomial
    j. Factor polynomials
    k. Solve polynomial equations
    l. Use a graph of a polynomial to find the number of real zeros and the number of imaginary zeros
    m. Write a polynomial with the given zeros
    n. Solve polynomial inequalities
7. Solve rational equations and inequalities
    a. Determine whether a function is a rational function
    b. Find the domain of a rational function
    c. Solve rational equations
    d. Solve rational inequalities
8. Solve problems involving exponential and logarithmic functions
    a. Find an exponential function to model the given data
    b. Recognize the properties of an exponential function from its graph
    c. Evaluate exponential functions

d. Solve application problems modeled by an exponential or logarithmic function
e. Evaluate a logarithmic expression
f. Recognize the properties of a logarithmic function from its graph
g. Find the domain of a logarithmic function
h. Solve exponential and logarithmic equations
i. Convert an equation to from exponential form to logarithmic form and vice versa
j. Use the properties of logarithms to expand or condense expressions
k. Use the change of base formula to evaluate logarithms

9. Solve systems of equations and inequalities
   a. Solve a system of equations by graphing
   b. Solve a system of equations by substitution
   c. Solve a system of equations by elimination
   d. Write a system of equations to model an applied problem
   e. Solve a system of nonlinear equations
   f. Graph a linear inequality in two variables
   g. Graph a system of linear inequalities in two variables
   h. Identify an ordered pair that is a solution to a system of linear inequalities
   i. Represent a system of equations with a matrix
   j. Solve a system of equations using row-echelon form and backward substitution
   k. Perform operations on matrices
   l. Find the inverse of a matrix
   m. Solve a system of equations using an inverse matrix
   n. Find the determinant of a matrix
   o. Solve a system of equations using Cramer's Rule
   p. Find the area of a triangle using a determinant

Prepared by: Andrea Williams, Mathematics Faculty 10/5/17

Name, Title Date

Approved Per LOT Minutes

Dean of Teaching and Learning Date