HIBBING COMMUNITY COLLEGE
COURSE OUTLINE

COURSE TITLE & NUMBER: College Algebra: MATH 1040
CREDITS: 4 (4 Lec/0 Lab)
PREREQUISITES: MATH 1020: Advanced Algebra with a grade of “C” or better, or Placement Test

CATALOG DESCRIPTION:
College Algebra topics include fundamentals of algebra, graphs, functions, equations, inequalities, polynomial and rational functions, exponential and logarithmic functions, systems of equations and matrices, conic sections, and the binomial theorem.

OUTLINE OF MAJOR CONTENT AREAS:
1. Basic concepts of algebra
   A. The real-number system
   B. Integer exponents, scientific notation, and order of operations
   C. Addition, subtraction, and multiplication of polynomials
   D. Factoring
   E. Rational expressions
   F. Radical notation and rational exponents
2. Graphs, functions, and models
   A. Introduction to graphing
   B. Functions and graphs
   C. Linear functions, slope, the point-slope equation, and applications
   D. Equations of lines and modeling
   E. More on functions
      1. Increasing, decreasing, and constant functions
      2. relative maximum and minimum values
      3. piecewise defined functions
   F. The algebra of functions
   G. Symmetry and transformations
3. Functions, equations, and inequalities
   A. Linear equations, functions, and models
   B. The complex numbers
   C. Quadratic equations, functions, and models
   D. Analyzing graphs of quadratic functions
   E. More equation solving
      1. rational equations
      2. radical equations
      3. equations with absolute value
   F. Solving linear inequalities
4. Polynomial and rational functions
   A. Polynomial functions and modeling
   B. Polynomial division
   C. The remainder and factor theorems
D. Theorems about zeros of polynomial functions
E. Rational functions
F. Polynomial and rational inequalities
G. Variation and applications

5. Exponential and logarithmic functions
   A. Composite and inverse functions
   B. Exponential functions and graphs
   C. Logarithmic functions and graphs
   D. Properties of logarithmic functions
   E. Solving exponential and logarithmic equations
   F. Growth and decay

6. Systems of equations and matrices
   A. Systems of equations in two variables
   B. Systems of equations in three variables
   C. Matrices and systems of equations
   D. Matrix operations
   E. Inverses of matrices
   F. Partial fractions

7. Conic sections
   A. The parabola
   B. The circle and ellipse
   C. The hyperbola
   D. Nonlinear systems of equations

8. The binomial theorem

**COURSE GOALS/OBJECTIVES/OUTCOMES:**

1. Students will perform operations on polynomial, rational, and radical expressions.
2. Students will solve rational, radical, absolute value, and quadratic equations and inequalities.
3. Students will graph equations, functions, and transformations of functions and determine intervals of increase or decrease, relative extrema, and symmetry.
4. Students will determine equations of lines.
5. Students will apply the Remainder Theorem, the Factor Theorem, and theorems about zeros of polynomial functions.
6. Students will perform polynomial division, graph rational functions, solve polynomial and rational inequalities, and solve variation problems.
7. Students will compose functions and determine inverses of functions.
8. Students will simplify and perform operations on exponential and logarithmic expressions.
9. Students will solve exponential and logarithmic equations and solve applied problems involving exponential and logarithmic equations.
10. Students will solve systems of equations using graphing, substitution, elimination, and matrix methods.
11. Students will decompose rational functions into partial fractions.
12. Students will graph and analyze conic sections and solve nonlinear systems of equations.
13. Students will use the binomial theorem to expand algebraic expressions.
MNTC GOALS AND COMPETENCIES MET:
Critical Thinking
Mathematical/Logical Reasoning

HCC COMPETENCIES MET:
Communicating Clearly & Effectively
Thinking Creatively & Critically

STUDENT CONTRIBUTIONS:
The student will attend class regularly, participate in class discussion, complete daily assignments, in class exercises, exams, and a comprehensive final examination. The student will spend a minimum of two hours completing assignments for every hour in class. These must be accomplished in such a way that they meet minimum standards set by the instructor.

STUDENT ASSESSMENT SHALL TAKE PLACE USING INSTRUMENTS SELECTED /DEVELOPED BY THE COURSE INSTRUCTOR.

SPECIAL INFORMATION:
The student may be required to provide a calculator for this course. If a specific calculator model is required, this model will be specified by the instructor on the course syllabus.

Curriculum Approval Date: October 2, 2017

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<th>AASC APPROVAL DATE</th>
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