ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

COMMON COURSE OUTLINE

Course discipline/number/title: MATH 1115: College Algebra

A. CATALOG DESCRIPTION

1. **Credits: 3**
2. **Hours/Week: 3**
3. **Prerequisites (Course discipline/number):** MATH 0099 or MATH 0100 or Concurrent enrollment in MATH 0915, READ 0900.
4. **Other requirements:** Prerequisites may be satisfied by equivalent Math and/or Reading placement scores.
5. **MnTC Goals (if any):** Goal 4/Mathematical/Logical Reasoning

B. COURSE DESCRIPTION: This is the first college level algebra course. Topics include but are not limited to: Polynomials, Rational, Exponential, and Logarithmic functions and their inverses, solving and graphing higher order equations, optimization applications, methods of solving systems or equations, and conic sections.

C. DATE LAST REVISED (Month, year): December, 2022

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Equations
2. Properties of Functions
3. Polynomial and Rational Functions
4. Exponential and Logarithmic Functions
5. Systems of Equations
6. Matrices
7. Inequalities

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Solve equations.
   a) Simplify and solve one variable equations of the form of higher degree polynomials, radical, and rational exponents.
   b) Manipulate equations involving complex conjugates.
   c) Identify conic equations. (Circle and Parabola)
   d) Solve direct, inverse, and joint variation application problems.
2. Illustrate an understanding of functions.
   a) Perform transformations and operations on functions.
   b) Identify properties of functions. (one-to-one, odd and even functions, piece-wise functions)
   c) Find the inverse of one-to-one functions.
   d) Simplify the difference quotient.
3. Apply concepts of polynomial and rational functions.
   a) Graph polynomial and rational functions using function properties and theory of equations.
   b) Simplify and solve polynomial and rational equations.
4. Apply concepts of exponential and logarithmic functions.
   a) Use properties exponential and logarithmic functions to create graphs.
   b) Simplify and solve single and multiple logarithmic equations and exponential equations.
   c) Find the inverse of exponential and logarithmic functions.
5. Solve systems of equations.
   a) Solve two variable nonlinear systems of equations using substitution, elimination, and graphing.
   b) Solve linear variable equations using matrix methods (Guass-Jordan Elimination, inverse matrices, and Cramer's Rule).
6. Perform operations on matrices including inverse.
7. Inequalities
   a) Solve polynomial and rational inequalities.
   b) Graph systems of nonlinear inequalities in two variables.

F. LEARNING OUTCOMES (MNTC):

Goal 4/Mathematics/Symbolic Systems: The student will be able to:

1. Illustrate historical and contemporary applications of mathematics/logical systems.

F. LEARNING OUTCOMES (MNTC): Continued. . .

2. Clearly express mathematical/logical ideas in writing.
3. Explain what constitutes a valid mathematical/logical argument (proof).
4. Apply higher-order problem solving and/or modeling strategies.

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:

1. Exams
2. Homework
3. Quizzes
4. Group Assignments
5. Comprehensive Final Exam

H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any):
A graphing calculator is required.