A. CATALOG DESCRIPTION
1. Credits: 4
2. Hours/Week: 4
3. Prerequisites (Course discipline/number): Successful completion of MATH 1115 with a grade of B or better recommended or appropriate score on placement or ACT test. College level reading
4. Co-requisites (Course discipline/number): None
5. MnTC Goals (if any): Goal/2 Critical Thinking, Goal 4/Mathematics and Logical Reasoning

This course is for students requiring further experience with advanced algebra. Topics include trigonometric functions and their inverses, trigonometric identities and equations, applications of trigonometry, graphing polar equations, conic sections, mathematical induction, sequences, series, and a review of many algebra topics.

B. DATE LAST REVISED (Month, year): January, 2014

C. OUTLINE OF MAJOR CONTENT AREAS:
1. Trigonometry
2. Conic sections
3. Sequences, Series, and Mathematical Induction
4. Review of Algebra Topics

D. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Upon completion of the Trigonometry topics, the student will be able to:
   a) Work in both degree and radian measure.
   b) Set up the six trigonometric ratios by using a right triangle and the circular definitions.
   c) Graph the six trigonometric functions and transformations of these graphs by hand and by using graphing technology.
   d) Identify the domain and range of all trigonometric functions and their inverses.
   e) Evaluate exact trigonometric functions, inverse trigonometric functions, and compositions of these related to all special angles by using reference angle principles or the definitions of inverse.
   f) Evaluate trigonometric functions, inverse trigonometric functions, and their compositions.
   g) Solve right triangles and right triangle applications.
   h) Work with trigonometric identities
      i. Simplify trig identities
      ii. Verify trig identities
      iii. Solve trig equations
      iv. Find exact values of trig expressions by using trig identities
   i) Solve non-right triangles using the Law of Sines and/or the Law of Cosines.
   j) Convert a vector among the various forms
      i. Component form
      ii. Linear combination of the I and j vectors (ai + bj form)
      iii. Magnitude and direction
   k) Perform vector operations and represent them graphically or in component form.
   l) Determine the angle between two vectors.
   m) Use vectors to model and solve application problems.
   n) Use the trigonometric form of complex numbers to find:
      i. Products
      ii. Quotients
      iii. Powers
      iv. nth roots
   o) Plot points in the polar coordinate plane.
   p) Convert coordinates from polar to rectangular or rectangular to polar.
   q) Convert equations from polar to rectangular or rectangular to polar.
   r) Graph polar equation.
D. LEARNING OUTCOMES (GENERAL): The student will be able to: Continued...

2. Upon completion of the Conic section topics, the student will be able to:
   a) Recognize, write the equations of, and graph any of the conic sections.
   b) Write the equations of the conic sections in standard form.
   c) Solve application problems involving the conic sections.
   d) Recognize, write the equation of, and graph a conic using polar form.

3. Upon completion of Sequences, series, and mathematical induction topics, the student will be able to:
   a) Generate the terms of a sequence from the definition (including arithmetic and geometric sequences).
   b) Find a formula for the nth term of a sequence (including arithmetic and geometric).
   c) Find the sum of a series written using summation notation.
   d) Write the summation notation for a series.
   e) Find the sum of arithmetic and geometric (finite and infinite) series.
   f) Find the mean of an arithmetic series.
   g) Use mathematical induction to prove a statement.

4. Review of Advanced Algebra Topics: Review as necessary:
   a) Functions: linear, quadratic, polynomial, rational, exponential, logarithmic
   b) Operations of functions including composition; transformations, inverses
   c) Solution methods for miscellaneous equations and inequalities
   d) Systems of linear and nonlinear equations and inequalities
   e) Matrix operations and solutions to systems using matrix methods
   f) Linear Programming

E. LEARNING OUTCOMES (MNTC):

Goal 2/Critical Thinking: The student will be able to:
1. Gather factual information and apply it to a given problem in a manner that is relevant, clear comprehensive, and conscious of possible bias in the information selected.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives, which can give alternative meanings or solutions to given situations or problems.
3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.
4. Recognize and articulate the value assumptions, which underlie and affect decisions, interpretations, analyses, and evaluations made by ourselves and others.

Goal 4/Mathematics/Symbolic Systems: The student will be able to:
1. Illustrate historical and contemporary applications of mathematics/logical systems.
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.

F. METHODS FOR EVALUATION OF STUDENT LEARNING:
1. Tests
2. Quizzes
3. Homework
4. Group assignments or projects
5. Comprehensive Exams

G. RCTC CORE OUTCOME(S) ADDRESSED:

☐ Communication ☐ Civic Responsibility
☒ Critical Thinking ☐ Personal/Professional Accountability
☐ Global Awareness/Diversity ☐ Aesthetic Response

H. SPECIAL INFORMATION (if any):
A Graphics calculator is required, TI is supported.