North Hennepin Community College

MATH 1170: Pre-Calculus

A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: *.*

Lab Hours/Week: *.*

OJT Hours/Week: *.*

Prerequisites:
This course requires any of these six prerequisite categories
  1. A score of 79 on test Accuplacer College Level Math
     Or
  2. A score of 3 on test Calculus Readiness Test
     Or
  3. A score of 26 on test ACT Math
     Or
  4. A score of 590 on test SAT Math Composite
     Or
  5. Both of these
       A score of 261 on test Accuplacer NG Advanced Algebra Functions
       A score of 3 on test Calculus Readiness Test
     Or
  6. MATH 1150 - College Algebra (Minimum grade: 1.67 GPA Equivalent)

Corequisites: None

MnTC Goals: Goal 04 - Mathematical/Logical Reasoning

This is a comprehensive course in trigonometry and extended topics in algebra. Topics include trigonometric functions and their graphs, inverse trigonometric functions and their graphs, trigonometric identities and equations, applications of trigonometry, conic sections, the binomial theorem, and sequences and series. Additional topics may include mathematical induction, combinations and permutations, and systems of nonlinear equations.

Prerequisites: College math placement level or successful completion of Math 1150 with grade of "C" or better

B. COURSE EFFECTIVE DATES: 08/20/2015 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

  1. This course is intended to prepare students for the study of calculus by covering all aspects of trigonometry necessary to succeed in calculus as well as any additional algebra topics needed for calculus that were not covered in college algebra.
  2. There are many ways to cover the necessary learner outcomes but use of the unit circle should be emphasized.
  3. If time permits, additional topics may be covered including systems of nonlinear equations, mathematical induction, combinations and permutations, parametric equations and equations using polar coordinates, or the dot product and applications involving dot product.

D. LEARNING OUTCOMES (General)

1. Define radian measure of angles; convert from degrees to radians and vice versa. (MnTC Goal 4: a, b; NHCC ELO 1, 2)
2. Define the trigonometric functions of angles and of real numbers and evaluate them with and without the aid of a calculator. (G4: a, b; ELO 1, 2)
3. Prove trigonometric identities, making use of fundamental identities, sum and difference identities, and double-angle and half-angle identities. (G4: c; ELO 1, 2)
4. Graph the six basic trigonometric functions. (G4: b, d; ELO 1, 2)
5. Graph variations of the graphs of $f(x) = \cos x$ and $f(x) = \sin x$ involving period changes, phase shifts, and amplitude changes. (G4: b, d; ELO 1, 2)
6. Solve applied problems using right triangle trigonometry, and problems involving the Law of Sines and the Law of Cosines. (G4: a, b, d; ELO 1, 2)
7. Solve trigonometric equations, including those that involve algebraic manipulations. (G4: b, d; ELO 1, 2)
8. Define the inverse trigonometric functions with emphasis on the inverse functions of $f(x) = \sin x$, $f(x) = \cos x$, and $f(x) = \tan x$; use these inverse functions to solve equations. (G4: b, d; ELO 1, 2)
9. Represent numbers on the complex plane in trigonometric form. (G4: b, d; ELO 1, 2)
10. Use trigonometric form to find products, quotients, powers, and roots of complex numbers. (G4: b, d; ELO 1, 2)
11. Find vertices, foci, asymptotes, and directrices (as appropriate) of the conic sections and graph the equations of the conic sections. (G4: b, d; ELO 1, 2)
12. Find explicit and recursive definitions for the nth term of sequences, particularly arithmetic and geometric sequences. (G4: b, c, d; ELO 1, 2)
13. Evaluate partial sums of arithmetic and geometric sequences. (G4: b, d; ELO 1, 2)
14. Find the direction and magnitude of a vector in component form. (G4: b, d; ELO 1, 2)
15. Solve applied problems that involve vectors, addition of vectors, and scalar multiplication of vectors. (G4: a, b, d; ELO 1, 2)
16. Expand powers of binomials using the Binomial Theorem. (G4: b, d; ELO 1, 2)

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 04 - Mathematical/Logical Reasoning

1. Illustrate historical and contemporary applications of mathematical/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. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

1. Knowledge of Human Cultures and the Physical and Natural World--Through study in the sciences, mathematics, social sciences, humanities, histories, languages, the arts, technology and professions.

2. Intellectual and Practical Skills--Including: Inquiry and analysis; Critical and creative thinking; Written and oral communication; Quantitative literacy; Information literacy; Teamwork and problem solving.