

# North Hennepin Community College

## MATH 1180: College Algebra and Pre-Calculus

### A. COURSE DESCRIPTION

Credits: 5

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites:

This course requires either of these prerequisite categories

1. Placement into MATH 1180

Or

2. MATH 1150 - College Algebra (Minimum grade: 1.67 GPA Equivalent)

Corequisites: None

MnTC Goals: Goal 04 - Mathematical/Logical Reasoning

This course is a very accelerated combination of Math 1150 and 1170 in one semester. It is recommended for strong students or can be used also as a refresher course for students who have successfully completed those two courses in the past. Topics include polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric functions, vectors, conic sections, and sequences and series. Additional topics may include polar coordinates or parametric equations.

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

### C. OUTLINE OF MAJOR CONTENT AREAS

1. The focus of the course are the topics listed in the course description. Priority should be given to the specific learner outcomes listed under part 8 of this document. However the instructor may also chose to spend time on the following outcomes: representing numbers on the complex plane in trigonometric form; using trigonometric form to find products, quotients, powers, and roots of complex numbers; induction; and/or expanding powers of binomials using the Binomial Theorem.

## D. LEARNING OUTCOMES (General)

1. Find real and complex zeros of polynomials (MnTC Goal 4: a); (NHCC ELO 1, 2)
2. Use the degree, leading coefficients, and multiplicities of zeros of a polynomial function to analyze graphs and equations. (G4: a,b,c,d; G2: c) (NHCC EOL 1,2)
3. Solve applied problems with exponential and logarithmic functions. (G4: a,b,c,d; G2: a,b,c) (NHCC EOL 1,2,4)
4. Find domains, intercepts, and asymptotes of rational functions and use these to graph the functions (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
5. Solve systems of non-linear equations in two variables. (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
6. Define radian measure of angles; convert from degrees to radians and vice versa. (G4: a,b,c,d; G2: a,b,c) (NHCC EOL 1,2,4)
7. Define the trigonometric functions of angles and of real numbers and evaluate them with and without the aid of a calculator. (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
8. Prove trigonometric identities, making use of fundamental identities, sum and difference identities, and double-angle and half-angle identities. (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
9. Graph the trigonometric functions, including variations of the graphs of  $\sin$  and  $\cos$  involving period changes, phase shifts, and amplitude changes. (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
10. Solve applied problems using right triangle trigonometry, and involving the Law of Sines and the Law of Cosines. (G4: a,b,c,d; G2: a,b,c) (NHCC EOL 1,2,4)
11. Solve trigonometric equations, including those that involve algebraic manipulations. (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
12. Define the inverse trigonometric functions with special emphasis on the inverse functions of  $\sin$ ,  $\cos$ , and  $\tan$ ; use these inverse functions to solve equations. (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
13. Find vertices, foci, asymptotes, and directrices (as appropriate) of the conic sections and graph the equations of the conic sections. (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
14. Find a definition for the  $n$ th term of a given sequence; find partial sums of arithmetic and geometric sequences. (G4: a,b,c,d; G2: b,c) (NHCC EOL 1,2,4)
15. Use vectors to solve applied problems. (G4: a,b,c,d; G2: a,b,c) (NHCC EOL 1,2,4)

## 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.
4. Integrative and Applied Learning - Including: Synthesis and advanced accomplishment across general education, liberal studies, specialized studies and activities in the broader campus community.