

Course Description**MAC1114 | Trigonometry | 3.00 credits**

This course will cover the analysis and graph of trigonometric functions and inverse trigonometric functions, the fundamental trigonometric identities, solutions to conditional trigonometric equations, solutions for both right and oblique triangles, operations on complex numbers in trigonometric form, work with vectors, graph both polar and parametric equations, and solutions of applications and modeling problems related to the above topics. Computational course.

Course Competencies:

Competency 1: The student will demonstrate an understanding of the trigonometric functions by:

1. Defining the trigonometric functions in three different ways: as ratios of sides of a right triangle, as functions of an angle in standard position in a Cartesian plane, and as functions of a real number, as represented by an arc length along the unit circle
2. Finding the domain and range of the trigonometric functions
3. Graphing the trigonometric functions both with and without transformations
4. Finding approximate values of the trigonometric functions using a calculator
5. Finding exact values of select trigonometric functions and their equivalent radians

Competency 2: The student will demonstrate an understanding of the trigonometric functions by:

1. Defining the inverse of trigonometric functions and stating their domains and ranges
2. Evaluating the inverse of trigonometric functions

Competency 3: The student will demonstrate an understanding of trigonometric identities by:

1. Simplifying trigonometric expressions
2. Finding exact values of trigonometric functions of sum of angles, differences of angles, double angle, and half-angle formulas
3. Using fundamental identities and the sum of angles, differences of angles, double angle, half-angle, product to sum, and sum to product formulas to establish identities
4. Using inverse trigonometric functions to solve equations

Competency 4: The student will demonstrate an ability to solve trigonometric equations by:

1. Finding all real solutions over a given interval
2. Finding all real solutions (general solutions) when a specified interval is not given
3. Using fundamental identities and the sum of angles, differences of angles, double angle, half-angle, product to sum, and sum to product formulas to solve equations

Competency 5: The student will demonstrate knowledge of solving triangles by:

1. Solving right triangles
2. Solving oblique triangles using the Law of Sines and the Law of Cosines

Competency 6: The student will demonstrate an understanding of complex numbers in trigonometric form by:

1. Converting a complex number from standard form ($a + bi$) to trigonometric form and vice versa
2. Multiplying and dividing complex numbers in trigonometric form
3. Raising complex numbers to positive integer powers using DeMoivre's Theorem
4. Finding the n th complex roots of a complex number

Competency 7: The student will demonstrate an understanding of vectors by:

1. Graphing vectors
2. Performing operations with vectors that include adding and subtracting vectors algebraically and geometrically and scalar multiples of vectors
3. Resolving vectors into components
4. Adding vectors algebraically, both in component form and when expressed as a linear combination.

Competency 8: The student will demonstrate an understanding of parametric equations by:

5. Sketching the graphs of curves defined parametrically
6. Finding rectangular equations for curves defined parametrically and vice versa

Competency 9: The student will demonstrate an understanding of polar coordinates by:

1. Converting from rectangular coordinates to polar coordinates and vice versa
2. Transforming rectangular equations into polar equations and vice versa
3. Graphing polar equations

Course Competency 10: The student will demonstrate an understanding of applications of trigonometry by:

1. Solving applications with arc lengths and areas of circular sectors
2. Solving applications with right triangles
3. Solving applications with oblique triangles
4. Solving applications with vectors

Learning Outcomes:

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information
- Create strategies that can be used to fulfill personal, civic, and social responsibilities