WTCS Repository

10-804-196 Trigonometry w Apps

Course Outcome Summary

Course Information

Description Topics include circular functions, graphing of trigonometry functions, identities, equations, trigonometric functions of angles, inverse functions, solutions of triangles complex numbers, DeMoivre's Theorem, polar coordinates, and vectors.

Total Credits 3.00

Pre/Corequisites

Prerequisite Each Wisconsin Technical College determines the General Education course prerequisites used by their academic institution. If prerequisites for a course are determined to be appropriate, the final Course Outcome Summary must identify the prerequisites approved for use by the individual Technical College.

Course Competencies

1. Define the trigonometric functions

Assessment Strategies

1.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

1.1. you graph angles in standard position.
1.2. you solve problems involving special right triangles.
1.3. you use trigonometric functions defined by using a point on the terminal side of an angle.
1.4. you use the trigonometric functions defined on the basis of a right triangle.
1.5. you prove simple trigonometric identifies.
1.6. you use degree-measures of angles including decimals as well as minutes and seconds.

2. Evaluate the trigonometric functions

Assessment Strategies

2.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

2.1. you identify exact values of trigonometric functions where appropriate.
2.2. you find approximate values of trigonometric functions using a calculator.
2.3. you use inverse trigonometric calculator functions to find measures of acute angles.
2.4. you solve right triangles using trigonometric functions and other properties of such triangles.
2.5. you use vectors applying a geometric approach.

3. Use radian measures of angles

Assessment Strategies

3.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

3.1. you use the concept of a reference angle.
3.2. you relate radian measures to real numbers.
3.3. you convert between radian measures and degree measures of angles.
3.4. you find exact and approximate values of angles described in radians.
3.5. you use trigonometric function defined for the unit circle.
3.6. you use the concept arc length and area of a sector.
3.7. you use the concepts of linear velocity and angular velocity.
3.8. you convert between linear velocity and angular velocity.

4. Interpret graphs of trigonometric functions

Assessment Strategies

4.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

4.1. you use basic graphs of trigonometric functions.
4.2. you identify domains and ranges of trigonometric functions using correct notation.
4.3. you identify undefined and restricted values for each basic trigonometric function.
4.4. you use concept of amplitude, period, and phase shift related to the graphs of trigonometric functions.

5. Graph equations of basic and modified trigonometric functions

Assessment Strategies

5.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

5.1. you sketch graphs of one period of basic trigonometric functions clearly and accurately.
5.2. you graph equations of trigonometric functions with variations in amplitude and/or period and with/without phase shifts.
5.3. you find equations from graphs of trigonometric functions.

6. Define the inverse of a trigonometric function

Assessment Strategies

6.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

6.1. you relate the inverse of trigonometric functions to the functions themselves.
6.2. you identify domains and ranges of inverses of trigonometric functions.
6.3. you sketch graphs of the inverse of trigonometric functions.
6.4. you evaluate the inverse of trigonometric function for given values of the domain.
6.5. you find inverse trigonometric function values, with and without a calculator.

7. Derive trigonometric identities

Assessment Strategies

7.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

7.1. you use the reciprocal, ratio, Pythagorean and other established identifies to derive new identities.
7.2. you use the techniques of algebra to prove new identifies.

8. Apply new trigonometric identities

Assessment Strategies

8.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

8.1. you use sum and difference formulas to evaluate trigonometric function of angles.
8.2. you use sum and difference formulas to prove other identities.
8.3. you use double-angle and half-angle formulas to evaluate trigonometric functions of angles.
8.4. you use double-angle and half-angle formulas to prove other identities.
8.5. you use sum-to-product and product-to-sum formulas to prove other identities.

9. Solve trigonometric equations

Assessment Strategies

9.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

9.1. you use algebraic techniques and trigonometric identities to solve equations involving trigonometric expressions of a single angle.
9.2. you use algebriac techniques and trigonometric identities to solve equations involving trigonometric functions of multiple angles.

10. Perform operations with parametric equations

Assessment Strategies

10.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

10.1. you eliminate the parameter from a pair of parametric equations.
10.2. you sketch the graphs which result from eliminating the parameter from a pair of parametric equations.

11. Solve oblique triangles

Assessment Strategies

11.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

11.1. you use the Law of Sines, the Law of Cosines, and properties of triangles to solve oblique triangles.
11.2. you calculate areas of oblique triangles using formulas that involve trigonometric functions.
11.3. you calculate areas of oblique triangles for which the lengths of all sides are known.
11.4. you solve application problems by solving oblique triangles.

12. Perform vector operations

Assessment Strategies

12.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

12.1. you define a vector algebraically.
12.2. you define unit vectors i and j.

12.3. you identify the horizontal and vertical components of a vector.
12.4. you find the magnitude of a vector.
12.5. you add and subtract algebraic vectors.
12.6. you perform scalar multiplication of vectors.
12.7. you obtain dot product of vectors.
12.8. you determine if two vectors are perpendicular or not.
12.9. you find the angle between two vectors.

13. Use trigonometry in vector applications

Assessment Strategies

13.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

13.1. you find the resultant of the combination of vectors.
13.2. you apply trigonometry to vector applications such as physics or engineering.

14. Perform operations with complex numbers in trigonometric form

Assessment Strategies

14.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

14.1. you transform complex numbers from rectangular form to trigonometric form and vice versa.
14.2. you graph complex numbers in trigonometric form and rectangular form.
14.3. you find products and quotients of complex numbers written in trigonometric form.
14.4. you find powers and roots of complex numbers written in trigonometric form.
14.5. you summarize DeMoivre's theorem.
14.6. you use DeMoivre's theorem to find powers and roots of complex numbers.

15. Relate the polar coordinate system to the rectangular coordinate system

Assessment Strategies

15.1. By a satisfactory score on all tests, quizzes, and/or graded assignments incorporating this competency.

Criteria

Your performance will be successful when:

15.1. you represent a point on the plane in both rectangular and polar coordinates.
15.2. you convert an equation in polar coordinates to rectangular coordinates and vice versa.
15.3. you graph equations in polar form.