

## WTCS Repository

10-804-196 Trigonometry w Apps

# Course Outcome Summary

### Course Information

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|  | Alternate Title | Trigonometry with Applications |
|  | Description | Topics include the unit circle, trigonometric functions, graphs, identities, equations, inverse functions, solutions of triangles, complex numbers, polar coordinates, and vectors. |
|  | Total Credits | 3 |
|  | Total Hours | 54 |

### Course History

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|  | Last Revision Date | 4/1/2021 |

Pre/Corequisites

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| 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

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| 1. | Analyze trigonometric functions |
|  | Assessment Strategies |
|  | 1.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 1.1. | graph angles in standard position |
|  | 1.2. | solve problems involving special right triangles |
|  | 1.3. | use reference angles to find exact values of trigonometric functions in any quadrant |
|  | 1.4. | find the exact value of a trigonometric function given a point on the terminal side of an angle |
|  | 1.5. | find the exact value of a trigonometric function given a right triangle |
|  | 1.6. | use reciprocal identities |
|  | 1.7. | use quotient identities |
|  | 1.8. | use Pythagorean identities |
|  | 1.9. | use even-odd identities |
|  | 1.10. | use cofunction identities |
| 2. | Evaluate the trigonometric functions |
|  | Assessment Strategies |
|  | 2.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 2.1. | identify exact values of trigonometric functions |
|  | 2.2. | find approximate values of trigonometric functions using a calculator |
|  | 2.3. | solve right triangles using inverse trigonometric functions |
|  | 2.4. | solve right triangles using trigonometric functions |
| 3. | Apply the unit circle and radian measure |
|  | Assessment Strategies |
|  | 3.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 3.1. | use the concept of a reference angle |
|  | 3.2. | graph angles in standard position given radian measure |
|  | 3.3. | relate radian measures to real numbers |
|  | 3.4. | convert between radian measures and degree measures of angles |
|  | 3.5. | find exact and approximate values of trigonometric functions given in radian measure |
|  | 3.6. | analyze the unit circle |
|  | 3.7. | find arc length and area of a sector |
| 4. | Analyze graphs of trigonometric functions |
|  | Assessment Strategies |
|  | 4.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 4.1. | sketch graphs of basic trigonometric functions |
|  | 4.2. | apply transformations to the graphs of trigonometric functions |
|  | 4.3. | identify domains and ranges of trigonometric functions and their graphs |
|  | 4.4. | identify domains and ranges of graphs of trigonometric functions |
|  | 4.5. | find equations from graphs of trigonometric functions |
| 5. | Analyze inverse trigonometric functions |
|  | Assessment Strategies |
|  | 5.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 5.1. | define the inverse trigonometric functions |
|  | 5.2. | identify domains and ranges of inverse trigonometric functions |
|  | 5.3. | sketch graphs of the inverse trigonometric functions |
|  | 5.4. | evaluate the inverse trigonometric functions |
|  | 5.5. | evaluate the composition of trigonometric and inverse trigonometric functions |
| 6. | Manipulate trigonometric identities |
|  | Assessment Strategies |
|  | 6.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 6.1. | use identities to evaluate trigonometric functions |
|  | 6.2. | use trigonometric identities to verify other identities |
|  | 6.3. | apply sum and difference identities |
|  | 6.4. | apply double-angle and half-angle identities |
|  | 6.5. | apply sum-to-product and product-to-sum identities |
| 7. | Solve trigonometric equations |
|  | Assessment Strategies |
|  | 7.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 7.1. | solve equations involving trigonometric expressions of a single angle |
|  | 7.2. | solve equations involving trigonometric expressions of multiple angles  |
|  | 7.3. | use correct notation to express infinite and finite solution sets of trigonometric equations |
| 8. | Solve oblique triangles |
|  | Assessment Strategies |
|  | 8.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 8.1. | use the Law of Sines to solve oblique triangles |
|  | 8.2. | use the Law of Cosines to solve oblique triangles |
|  | 8.3. | calculate areas of oblique triangles |
|  | 8.4. | solve application problems involving oblique triangles |
| 9. | Perform vector operations |
|  | Assessment Strategies |
|  | 9.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 9.1. | define a vector  |
|  | 9.2. | define unit vectors i and j |
|  | 9.3. | identify the horizontal and vertical components of a vector |
|  | 9.4. | find the magnitude of a vector |
|  | 9.5. | find the direction of a vector |
|  | 9.6. | perform vector addition  |
|  | 9.7. | perform scalar multiplication of vectors |
|  | 9.8. | compute dot product of vectors |
|  | 9.9. | determine if two vectors are perpendicular  |
|  | 9.10. | find the angle measure between two vectors |
| 10. | Perform operations with complex numbers in trigonometric form |
|  | Assessment Strategies |
|  | 10.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 10.1. | convert complex numbers between rectangular form and trigonometric form |
|  | 10.2. | graph complex numbers in trigonometric form and rectangular form |
|  | 10.3. | find products of complex numbers written in trigonometric form |
|  | 10.4. | find quotients of complex numbers written in trigonometric form |
| 11. | Analyze the polar coordinate system |
|  | Assessment Strategies |
|  | 11.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | Your performance will be successful when you: |
|  | 11.1. | identify points in the polar coordinate system |
|  | 11.2. | translate between rectangular coordinates and polar coordinates for a given point |
|  | 11.3. | convert an equation between polar form and rectangular form |
|  | 11.4. | explore graphs of equations in polar form |