

## WTCS Repository

10-804-116 College Technical Math 2

# Course Outcome Summary

### Course Information

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|  | Description | Topics include: vectors; trigonometric functions and their graphs; identities; exponential and logarithmic functions and equations; radical equations; equations with rational exponents; dimension of a circle; velocity; sine and cosine graphs; complex numbers in polar and rectangular form; trigonometric equations; conic sections; and analysis of statistical data. Emphasis will be on the application of skills to technical problems. |
|  | Total Credits | 4.00 |

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 | Graph exponential and logarithmic functions |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | graph exponential functions  graph logarithmic functions  relate logarithmic functions to its inverse function  graph functions on logarithmic or semi-logarithmic scales  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 2 | Solve exponential and logarithmic equations |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | solve exponential equations  solve logarithmic equations  solve applied problems involving exponential or logarithmic equations, such as growth and decay  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 3 | Perform operations with exponents and radicals |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | evaluate an expression containing rational powers on numbers with rational roots  convert between rational powers and radical notation  simplify radical expressions |
| 4 | Solve equations with radicals and rational exponents |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | convert between radical and fractional exponent form  solve radical equations involving one variable  solve equations with fractional exponents  verify solutions by substitution into the original equation  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 5 | Use formulas involving radicals and exponents |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | choose formula when appropriate  identify unknown value(s)  relate the given values to the variables in the formula formed after given values are substituted into a formula that includes radical expressions  transform a formula by isolating a variable which is contained in a radical expression  solve equations formed after given values are substituted into a formula that includes radical expressions  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 6 | Calculate unknown dimensions as related to a circle |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | calculate the length of a circular arc, given the radius and central angle  calculate the central angle and the chord depth, given the radius and chord length of a circle  calculate the area of a sector of a circle, given the radius and central angle  calculate the area of a segment of a circle, given the radius, central angle, and area of sector to which the segment belongs  calculate the length of a chord, given the radius and the angle between the chord and a tangent at one end of the chord  calculate the angle between two tangents, given the radius of a circle and the length of the segments attached to the circle  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 7 | Solve rotational, linear, and angular velocity problems |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | calculate the linear velocity of a point on the circumference of a wheel, given either the diameter or radius and the angular velocity  calculate the angular velocity of a point on the circumference of a wheel when given either the diameter or radius and the linear velocity  convert between radians over time and revolutions over time  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 8 | Perform operations with vectors |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | determine the resultant of two or more vectors  resolve vectors by components  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 9 | Perform arithmetic operations using complex numbers in both polar and rectangular forms |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | add, subtract, multiply, and divide in rectangular form  multiply and divide in polar form  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 10 | Relate complex (rectangular) notation to polar notation |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | convert between polar and rectangular form  use the quadratic equation to find non-real solutions  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 11 | Interpret sine/cosine graphs |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | identify the amplitude from a sine or cosine wave graph  identify the phase shift  write the equation of a sine/cosine graph  label amplitude, period, phase shift, and frequency for graph  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 12 | Graph sine/cosine waves |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | plot a graph of sine/cosine wave from an equation  plot a graph of sine/cosine wave given the amplitude, frequency, and phase shift  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 13 | Solve trigonometric equations |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | manipulate identities  factor trigonometric expressions  write a trigonometric expression in terms of sine and cosine  solve trigonometric equations with multiple solutions  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 14 | Analyze the equations of conic sections and their graphs |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | determine, by inspection, whether a given second-degree equation represents a circle, ellipse, parabola, or hyperbola  write the equation of a circle, ellipse, parabola, or hyperbola from given information  construct a graph of any of the conic sections from equation(s)  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |
| 15 | Analyze data statistically |
|  | Assessment Strategies |
|  | in an oral, written, or graphic product |
|  | Criteria |
|  | Criteria: Performance will be satisfactory when you: |
|  | calculate measures of central tendency  calculate measures of dispersion  construct a graph that describes data  interpret data in terms of statistics  apply skill to technical problems  utilize appropriate technology  apply the process for solving technical problems according to the problem-solving criteria (i.e. you show work in a clear and logical manner, you verify the solution, solution is within stated range and reflects appropriate accuracy or precision, solution is labeled with appropriate units) |