

**DELAWARE TECHNICAL & COMMUNITY COLLEGE
CAMPUS COURSE SYLLABUS**



Campus: Terry

Department: Mathematics

Course Number and Title: MAT 182 Algebra and Trigonometry II

Instructor Name: **Telephone:** **E-mail:**

Prerequisites: Mat 181.

Corequisites: None

Course Hours and Credits: 4:0:4

Course Description: A study of circular and trigonometric functions, vector applications, complex numbers, simple curve sketching of algebraic and trigonometric functions, nonlinear systems, matrix methods, and properties of conic sections.

Required Text: Aufmann, Barker, and Nation (2005). College Algebra and Trigonometry. Houghton Mifflin Company.

Materials: Graphing Calculators:
TI 83/84 or above; or HP 48/49
Graph paper
Straight edge/ruler

Method of Instruction: Lecture

Manuals: None

Disclaimer: None

CORE COURSE PERFORMANCE OBJECTIVES

The student will be able to:

1. Solve problems of application involving circular and trigonometric functions. (CCC2,7)
2. Solve problems of application involving vector. (CCC 2,7)
3. Perform basic operations on complex numbers. (CCC 2,7)
4. Sketch algebraic and trigonometric functions. (CCC 2,7)
5. Solve linear and nonlinear systems. (CCC 6,7)
6. Perform operations on matrices. (CCC 6,7)
7. Solve problems of application involving conic sections. (CCC 2,6,7,9)

Measurable Performance Objectives

1. **Solve problems of application involving circular and trigonometric functions. (CCC 2, 7)**
 - 1.1 Use notational conventions in trigonometry.
 - 1.2 Memorize basic right-triangle identities.
 - 1.3 Use basic right triangle identities to simplify trigonometric expressions.
 - 1.4 Use the concepts of right triangle trigonometry to solve applications.
 - 1.5 Find the area of triangles.
 - 1.6 Use terminology regarding angles in standard position, including initial and terminal sides, positive and negative angles.
 - 1.7 Define trigonometric functions in terms of the unit circle.
 - 1.8 Determine the signs of trigonometric functions.
 - 1.9 Find reference angles.
 - 1.10 Review the trigonometric functions of special angles and work with quadrantal angles.
 - 1.11 Define and use radian measure of an angle.
 - 1.12 Evaluate trigonometric functions using radian measure.

- 1.13 Use radian measure to determine arc length and sector area.
 - 1.14 Apply radian measure properties to angular and linear speed.
 - 1.15 Use opposite-angle and periodicity identities to evaluate trigonometric functions.
 - 1.16 Develop the sum and difference of angles of the sine, cosine, and tangent functions.
 - 1.17 Use sum and difference formulas to evaluate some trigonometric functions.
 - 1.18 Use sum and difference formulas to prove trigonometric identities.
 - 1.19 Develop the double-angle and half-angle formulas using the sum and difference angles.
 - 1.20 Evaluate various trigonometric functions using the formulas learned and developed.
 - 1.21 Prove identities using the formulas learned and developed.
 - 1.22 Develop product-to-sum and sum-to-product formulas using the sum and difference formulas.
 - 1.23 Use the developed formulas to convert trigonometric expressions to other forms.
 - 1.24 Use combinations of sum and difference, double-and half-angle, and sum-product identities to prove trigonometric identities.
 - 1.25 Find solutions and roots of trigonometric equations using both an algebraic and graphical perspective.
 - 1.26 Use inverse trigonometric functions to solve trigonometric equations.
2. **Solve problems of applications involving vector. (CCC 2, 7)**
- 2.1 Sketch the graphs of sine and cosine functions considering their period, amplitude and phase shift.
 - 2.2 Solve application problems involving simple harmonic motion.
 - 2.3 Graph the tangent and reciprocal functions.

- 2.4 Develop the laws of sines and cosines and use them to solve applications problems involving oblique triangles.
- 2.5 Define and illustrate vectors in a plane using a geometric approach.
- 2.6 Define and use vectors in the plane using an algebraic approach.
- 3. **Perform basic operations on complex numbers. (CCC 2, 7)**
 - 3.1 Define complex numbers and the imaginary unit, real and imaginary parts.
 - 3.2 Determine equality of complex numbers and find the complex conjugate of complex numbers.
 - 3.3 Perform the operations of addition, subtraction, multiplication and division of complex numbers.
 - 3.4 Use trigonometric or polar forms of complex numbers and DeMoivre's Theorem to multiply and divide, and find powers and roots of complex numbers.
- 4. **Sketch algebraic and trigonometric functions. (CCC 2, 7)**
 - 4.1 Graph inverse trigonometric functions.
 - 4.2 Graph conic sections.
- 5. **Solve linear and nonlinear systems. (CCC 6, 7)**
 - 5.1 Solve linear systems of equations using the augmented matrix and elementary row operations.
 - 5.2 Use Cramer's Rule to solve a linear system of equations.
 - 5.3 Solve nonlinear systems of equations.
 - 5.4 (OPTIONAL) Solve linear programming problems using systems of linear inequalities.
- 6. **Perform operations on matrices. (CCC 6, 7)**
 - 6.1 Define equality of matrices.

- 6.2 Perform matrix operations of addition, subtraction, scalar multiplication, and the multiplication of two matrices.
- 6.3 Find the inverse of a square matrix.
- 6.4 Use the inverse matrix and a graphing calculator to solve a linear system equations.
- 6.5 Find the determinant of a square matrix.
- 7. **Solve problems of applications involving conic sections. (CCC 2, 6, 7, 9)**
 - 7.1 Find the distance from a point to a line.
 - 7.2 Define and describe the basic properties of a parabola.
 - 7.3 Define and describe the basic properties of an ellipse.
 - 7.4 Define and describe the basic properties of a hyperbola.
 - 7.5 Define and describe the focus-directrix property of conics.
 - 7.6 (OPTIONAL) Define and describe the conics in polar equations.
 - 7.7 (OPTIONAL) Define and describe formulas for the rotation of axes.

EVALUATION CRITERIA

Students will demonstrate proficiency on all Measurable Performance Objectives at least to the 75% level. The final grade will be determined using the College Grading System:

92 - 100	A
83 - 91	B
75 - 82	C
0 - 74	R

Students should refer to the Student Handbook for information on Academic Standing Policy, Academic Honesty Policy, Students Rights and Responsibilities and other policies relevant to their academic progress.