Algebra and Trigonometry I
Syllabus
Revised Fall 2009

Course Information

Organization	MCCC Course coordinator: Antonio Gutierrez gutierraj@mccc.edu
Course Number	MAT115
Credits	3
Contact Hours	3
Number of Weeks	15

Description
Primarily for students majoring in the engineering technology or related programs. Algebraic topics discussed include systems of linear equations, determinants, factoring, trigonometric functions and their graphs, radian measure, solutions of triangles, and application problems.

Prerequisites
Completion of MAT037 (formerly MAT034) with a grade of C or better or MAT037A **and** MAT037B with a grade of C or better in both courses, successful completion of a course equivalent to MAT037, an appropriate score on the Higher Placement Test, or permission of the department chairperson.

Textbooks
Washington. *Basic Technical Mathematics. Pearson, Prentice Hall.* **Edition:** 9th.
ISBN-13: 978- 0-13-814225-4. I**SBN-**10: 0-13-814225-4.

Learner Supplies
calculator.

Core Abilities
A. Use critical thinking and problem solving skills in analyzing information.
B. Recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.
C. Use computers to access, analyze or present information, solve problems, and communicate with others.

General Education Outcomes
A. Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
B. Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Competencies

1. Solve problems involving triangles using trigonometric functions. 4 lecture hours

Linked Core Abilities

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General Education Outcomes

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Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Learning Objectives

a. Define and give examples for angle, degree, minute, second, co-terminal angles, standard position of an angle and quadrantal angles.

b. Define all six trigonometric functions of angle (in terms of x, y, and r).

c. Find the values of trigonometric functions of acute angles by using a scientific calculator.

d. Define the trigonometric functions of the given angle in terms of the side opposite, side adjacent to the angle and the hypotenuse of the right triangle.

e. Determine (without tables, calculators, etc.) the values of all the trigonometric functions of the special angles of 30 , 45 , and 60 by utilizing some basic elementary concepts in plane geometry related to isosceles and equilateral triangles.

f. Solve the triangle (i.e. find the three missing parts)., given a right triangle side and one other part (either another side or one of the acute angles)

g. Apply solutions of right triangles to the above with respect to relatively simple word problems

2. Solve linear equations and systems of linear equations using various methods. 4 lecture hours

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Use computers to access, analyze or present information, solve problems, and communicate with others.

General Education Outcomes

Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Learning Objectives

a. Define and illustrate by giving specific examples and graph linear equations in two variables and determine those which are linear.

b. Solve system of two linear equations with two unknowns using the four different methods:

elimination by addition-subtraction, elimination by substitution, graphing, and Cramer's rule using determinants.

c. Solve systems of three linear equations with three unknowns by the algebraic method of elimination by addition-subtraction, by Cramer's rule involving determinants.

d. Solve word problems involving two or three unknowns.

3. Solve polynomial and rational equations using various techniques. 6 lecture hours

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General Education Outcomes

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Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Learning Objectives

a. Factor completely algebraic binomials and trinomials

b. Factor by grouping algebraic binomials and trinomials

c. Reduce algebraic fractions to their simplest form

d. Multiply, divide, add and subtract algebraic fractions.

4. Solve quadratic equations using several methods. 2 lecture hours

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Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Learning Objectives

a. Define and identify a quadratic equation in terms of a given variable

b. Solve quadratic equations using factoring and extraction of roots(square root method).

c. Use completing the square to solve any quadratic equation with rational coefficients.

d. Derive the quadratic formula and use it to solve any quadratic equation with rational coefficients.

e. Solve word problems involving quadratics.

5. Use exponents and radicals to solve problems. 4 lecture hours

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Learning Objectives

a. Write the rules of exponents.

b. Simplify problems involving integral and rational exponents.

c. Write the rules of radicals.

d. Translate expressions in radical notation into exponential notation and vice versa.

e. State the requirements for simplest radical form and given a radical expression rewrite it in simplest radical form.

f. Add, subtract, multiply, and divide radical expressions, leaving the answers in simplest radical form.

6. Extend understanding of trigonometric functions to any angle and use radian measure to solve problems. 3 lecture hours

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Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Learning Objectives

a. Know that the trigonometric functions of co terminal angles are equivalent.

b. Evaluate any trigonometric function's value of any angle and conversely

c. Evaluate without outside aid (calculators, tables, etc.) the trigonometric functions of the quadrantal angles by utilizing the basic definitions of the trigonometric functions

d. Define the radian measure of an angle and be able to convert from degree measure to radian measure and conversely without being given the conversion factors.

e. Solve applications arc length, area of a sector and linear velocity using radian measure

7. Use vectors and oblique triangles to solve problems. 2 lecture hours

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Learning Objectives

a. Define and give examples of vectors(optional)

b. Represent vector quantities graphically and perform the operations of addition and subtraction, both graphically and algebraically (involving trigonometry by the resolving of the vectors into their x and y components).

c. Solve word problems involving the application of vectors(optional).

d. Apply the Law of Sines and the Law of Cosines to the solution of oblique triangles and word problems.

8. Apply graph of trigonometric functions to the solutions of problems. 5 lecture hours

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Learning Objectives

a. Define and give examples of periodic function, period, amplitude, phase angle and displacement.

b. Determine the amplitude, period and the displacement as well as graph one complete cycle of the sinusoid functions.

c. Graph all trigonometric functions utilizing the concept of reciprocal functions.

d. Graph examples involving addition of ordinates and parametric equations.

e. Solve applications involving the trigonometric graphs and composite trigonometric curves

Grading Information

Instructor created tests, quizzes, homework assignments and projects may be used in evaluating the students' progress. The instructor will create and administer a cumulative final exam. A suggested day-by-day schedule and suggested homework problems are available to the instructors. These are available from the course coordinators.

A possible plan for determining the students' final grades is as follows:

Unit tests (four - one for every two units)60%
Cumulative Final Exam 25%
Homework, Projects and quizzes 15%

Guidelines for Success

General Objectives
1. To develop within the student a confidence and competence in some computational skills in mathematics.

2. To develop skills in the areas of algebra (elementary, intermediate and in part, advanced) and trigonometry with the intention that the students may apply these skills to future technical pursuits.

3. To develop a mathematical maturity within the student to enable him to read, analyze and solve a variety of word problems.

4. To develop an appreciation of elementary mathematical theory to reinforce the understanding of the applications.

Academic Integrity Statement
Under no circumstance should students knowingly represent the work of another as one's own. Students may not use any unauthorized assistance to complete assignments or exams, including but not limited to cheat-sheets, cell phones, text messaging and copying from another student. Violations should be reported to the Academic Integrity Committee and will be penalized. Please refer to the Student Handbook for more details.