

Applied Electronic Math 1

Course Outcome Summary

Course Information

Organization	Madison Area Technical College
Developers	Terry O'Laughlin
Development Date	10/7/2005
Course Number	10-605-171
Instructional Level	Associate Degree
Potential Hours of Instruction	84
Total Credits	3

Description

First of a two-part applied electronics mathematics sequence. Focuses on math concepts most needed by technicians. Closely tied to the other first-semester electronics courses. Emphasizes math as a powerful tool. The order of topics is dictated by math skills needed to complete concurrent courses. Laboratory sessions with circuits, instruments and computers help students appreciate the connections between math and electronic circuits.

Types of Instruction

Instruction Type	Contact Hours	Credits
Classroom Presentation	48	3
On-Campus Lab	36	

Textbooks

Arthur Kramer. *Mathematics for Electricity and Electronics*. Prentice Hall, Inc.. **Edition:** 3rd.

Learner Supplies

A scientific (or graphing) calculator. **Manufacturer:** ---.

Prerequisites

Math placement test score OR Algebra Concepts (10-804-140) with a C or better

Exit Learning Outcomes

Core Abilities

- A. Critical thinking
- B. Mathematics

Competencies

- A. **Perform basic operations with real numbers, symbols and laws of algebra**
Competence will be demonstrated:
 - B.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- B.1. you perform order of operations
- B.2. you use implied grouping symbols
- B.3. you calculate, using a scientific calculator or graphing calculator, arithmetic operations, including use of the parenthesis keys
- B.4. you solve expressions using the laws of signed numbers
- B.5. you solve expressions using commutative laws
- B.6. you solve expressions using distributive laws
- B.7. you solve expressions using associative laws
- B.8. you solve expressions using the operations with zero
- B.9. you solve expressions using the laws of exponents
- B.10. you solve expressions using the laws of scientific notation
- B.11. you solve expressions using the laws of radicals

B. Solve problems involving the basic operations with algebraic expressions

Competence will be demonstrated:

- C.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- C.1. you solve expressions involving addition of polynomials
- C.2. you solve expressions involving subtraction of polynomials
- C.3. you solve expressions involving multiplication of polynomials
- C.4. you solve expressions involving division of polynomials
- C.5. you apply skill to applied technical problems
- C.6. you apply the process for solving technical problems according to the problem solving criteria

C. Solve linear equations in one unknown

Competence will be demonstrated:

- D.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- D.1. you solve linear equations in one variable
- D.2. you rearrange a formula to solve for an indicated first-degree variable
- D.3. you represent unknown(s) with a variable
- D.4. you translate English phrases into equations
- D.5. you substitute given number for variables into formula or equations
- D.6. you apply skill to applied technical problems
- D.7. you apply the process for solving technical problems according to the problem solving criteria

D. Solve linear equations in two unknowns

Competence will be demonstrated:

- B.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- B.1. you solves a system of linear equations involving two variables
- B.2. you solves a system by elimination

- B.3. you solves a system by substitution
- B.4. you evaluates second determinants
- B.5. you uses Cramer's Rule to solve systems
- B.6. you apply skill to applied technical problems
- B.7. you apply the process for solving technical problems according to the problem solving criteria

E. Factor algebraic expressions

Competence will be demonstrated:

C.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- E.1. you factor using the greatest common factor
- E.2. you factor binomials and trinomials

F. Perform operations with algebraic fractions

Competence will be demonstrated:

D.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- F.1. you add rational expressions
- F.2. you subtract rational expressions
- F.3. you multiply rational expressions
- F.4. you divide rational expressions

G. Solve rational equations

Competence will be demonstrated:

E.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- G.1. you apply multiplication property to clear all denominators
- G.2. you solve rational equations
- G.3. you solve a formula for an identified variable
- G.4. you apply skill to applied technical problems
- G.5. you apply the process for solving technical problems according to the problem solving criteria

H. Solve quadratic equations over the set of real numbers

Competence will be demonstrated:

F.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- F.1. you identify coefficients of a quadratic equation in standard form
- F.2. you select appropriate method for solving second-degree equations
- F.3. you generate the equation which satisfies the conditions of the problem
- F.4. you solve second-degree equation using the selected method
- F.5. you select relevant solution(s)
- F.6. you apply skill to applied technical problems
- F.7. you apply the process for solving technical problems according to the problem solving criteria

- I. Perform operations with exponents and radicals**
Competence will be demonstrated:
G.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency
Criteria - Performance will be satisfactory when:
I.1. you calculate roots of rational numbers using a calculator
I.2. you evaluate an expression containing rational numbers having rational powers using a calculator
I.3. you evaluate an expression containing rational powers on numbers with rational roots
I.4. you use properties of exponents, solve an expression containing rational powers on variables assumed to have rational roots
- J. Solve equations with radicals and/or exponents**
Competence will be demonstrated:
H.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency
Criteria - Performance will be satisfactory when:
H.1. you solve radical equations involving one variable
H.2. you verify solutions by substitution into original equation
H.3. you apply skill to applied technical problems
H.4. you apply the process for solving technical problems according to the problem solving criteria
- K. Solve exponential and logarithmic equations**
Competence will be demonstrated:
I.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency
Criteria - Performance will be satisfactory when:
I.1. you solve exponential equations
I.2. you solve logarithmic equations
I.3. you solve applied problems involving exponential or logarithmic equations, such as growth and decay
I.4. you apply skill to applied technical problems
I.5. you apply the process for solving technical problems according to the problem solving criteria
- L. Solve equations using right angle trigonometry**
Competence will be demonstrated:
J.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency
Criteria - Performance will be satisfactory when:
J.1. you use right angle trig to solve applied technical problems
J.2. you apply the process for solving technical problems according to the problem solving criteria
- M. Solve right triangles**
Competence will be demonstrated:
L.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency
Criteria - Performance will be satisfactory when:

- L.1. you use the angle-sum principle to compute the third angle of a triangle
- L.2. you use the Pythagorean theorem to compute a side of a right triangle
- L.3. you use sine, cosine, and tangent ratios to compute sides and/ or angles of right triangles
- L.4. you apply skill to applied technical problems
- L.5. you apply the process for solving technical problems according to the problem solving criteria

N. Use the trigonometric functions of any angle

Competence will be demonstrated:

- M.1. by a satisfactory score on all tests, quizzes, or graded assignments incorporating this competency

Criteria - Performance will be satisfactory when:

- M.1. you write the signs of the trig functions in all 4 quadrants
- M.2. you find the value or trig function for an angle / value greater than 90 degrees
- M.3. you define a radian
- M.4. you apply radian measure to arcs, areas of sectors, and angular velocity
- M.5. you define a vector
- M.6. you add vectors by components
- M.7. you apply skill to applied technical problems
- M.8. you apply the process for solving technical problems according to the problem solving criteria