San Bernardino Valley College
Curriculum Approved: December 9, 2004

I.   COURSE INFORMATION:
   A.   Division: Technical
         Department: Electricity/Electronics
         Course ID: TECALC 087
         Course Title: Technical Calculations
         Units: 4
         Lecture: 4 Hours
         Laboratory: None
         Prerequisite: None
         Corequisite: None
         Dept. Advisory: None

   B.   Catalog and Schedule Description:
         Practical use and applications of technical calculations on topics such as electrical, measurements, temperature, volume, weight, and positioning. Includes the number line, working with dedicated formula, applied problems, geometric principles, graphs, right triangles, coordinate systems, and scientific notation.

II.   NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III.   EXPECTED OUTCOMES:
         Upon successful completion of the course, the student should be able to:
   A.   Identify and compute with signed numbers.
   B.   Convert and calculate with different technical characteristics: Electrical, temperature, volume, and weights.
   C.   Interpret and solve formulas.
   D.   Analyze, interpret, and solve applied problems from different technical characteristics.
   E.   Recognize and explain different geometric principles: Perpendicular, parallel, different angles, triangles, quadrilaterals, and circles.
   F.   Solve right triangles and determine coordinates as used in AC circuit analysis and machine positioning.
   G.   Explain and use scientific notation with and without calculators.

IV.   COURSE CONTENT:
   A.   Using signed numbers
         1. Number line
         2. Combining signed numbers
         3. Working with signed numbers
         4. Factoring out common factors
   B.   Technical characteristics
         1.   Electrical
               a) Current
               b) Voltage
               c) Resistance
               d) Reactance
         2.   Temperature
               a) Fahrenheit to Celsius conversions
         3.   Volume
               a) Cubes
               b) Cylinders
         4.   Weight
   C.   Working dedicated formula and applied problems
         1.   Working with literal formulas
               a) Ohms law, Boyles law, etc.
         2.   Selecting formula from sentences
         3.   Applied work problems

      D. Geometric principles
         1. Perpendicular
         2. Parallel
         3. Angles
            a) Acute
            b) Right
            c) Obtuse
            d) Reflex
            e) Complementary
         4. Triangles
         5. Quadrilaterals
         6. Circles
      E. Introduction to charts, graphs, and right triangles
         1. Charts and graphs
            a) XY
            b) Column
            c) Pie
         2. Pythagorean theorem
         3. Determining angle values in degrees and minutes
         4. Trigonometric ratios
         5. Inverse trigonometry
         6. Solving right triangles
      F. Coordinate systems
         1. Rectangular coordinates
         2. Measurement systems
            a) Absolute
            b) Incremental
         3. Polar coordinates
         4. Changing rectangular to polar and polar to rectangular
         5. Adding and subtracting with rectangular coordinates
         6. Multiplying and diving with polar coordinates
      G. Scientific notation
         1. Standard position
         2. Engineering with metric prefix
         3. Exponential notation

V. METHODS OF INSTRUCTION: (Please check all that apply and add any additional not listed.)

X Lecture
X Class and/or small group discussion
_____ Critical evaluation of texts, newspapers, journal articles, and other printed research
_____ Critical evaluation of films, videotapes, audiotapes, or other media forms
_____ Classroom demonstrations
_____ Field trips
_____ Guest speakers
_____ Other:
_____ Other:
_____ Other:

VI. TYPICAL OUT-OF-CLASS ASSIGNMENTS:
    A. Reading Assignment. Reading assignments are required and may include (but are not limited to) the following: After reading the chapter on Applied Methods, discuss in small groups the complex numbers and their usage in triangulation and circuit integration.

B. <u>Writing Assignment.</u> Writing assignments are required and may include (but are not limited to) the following: Written homework assigned each week from the questions and problems in each chapter
Typical Question: Explain scientific notation.

C. <u>Critical Thinking Assignment.</u> Critical thinking assignments are required and may include (but are not limited to) the following:
1. What is the horsepower of an electric motor that requires 110v and draws the 2.3 amps.
2. Indicate the equivalent position, (15 + J10)+(40 - J6)

VII.   EVALUATION:

A student's grade will be based on multiple measures of performance and will reflect the objectives explained above. A final grade of "C" or better should indicate that the student has the ability to successfully apply the principles and techniques taught in this course. These evaluation methods may include, but are not limited to, the following (Please check all that apply, and add additional ones not listed):

_____ Portfolios
_____ Projects
_____ Written papers or reports
_____ Presentations (oral and visual)
_____ Work performance (internships or field work)
_____ Lab work
X Comprehensive examinations (cumulative finals or certifications)
_____ Peer evaluation
_____ Self evaluation
_____ Classroom participation
_____ Homework
_____ Other:
_____ Other:
_____ Other:

VIII.   TYPICAL TEXTS:

A. Robert A. Carman, <u>Mathematics for the Trades</u>, 6th Edition, Prentice Hall, Englewood Cliffs, New Jersey, 2002
B. Richard C. Spangler, <u>Basic Mathematics for Occupational and Vocational Students</u>, Prentice Hall, Englewood Cliffs, New Jersey, 2001

IX.   OTHER SUPPLIES REQUIRED OF STUDENTS:

Scientific calculator