College of San Mateo
Official Course Outline

1. **COURSE ID:** ELEC 232 **TITLE:** Advanced Electronics Mathematics
   Units: 2.0 units **Hours/Semester:** 32.0-36.0 Lecture hours; and 64.0-72.0 Homework hours
   Method of Grading: Letter Grade Only
   Prerequisite: ELEC 231

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: CSU

3. **COURSE DESCRIPTIONS:**
   Catalog Description:
   In depth study of algebra, trigonometry, logarithms and graphing as applied to amplifier, oscillator and microwave circuits.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
   1. Analyze and solve typical algebra problems utilizing recognized problem solving procedures.
   2. Plot a curve on X-Y graph paper of two or more variables and interpret the meaning of the data represented.
   3. Solve right triangle trigonometry problems and apply these techniques to alternative current voltage, current and phase relationships.
   4. Define the difference between common and natural logarithms.
   5. Relate common and natural logarithms to exponential calculations and describe how logarithms are a superior method to solve these calculations.
   6. Apply common and natural logarithms to electronics calculations, such as gain/loss and charge/discharge measurements.
   7. Define the j-operator in electronics calculations and how it is applied to electronics circuit analysis.
   8. Define and contrast rectangular and polar notation and how they relate to j-operator calculations.
   9. Apply the rules of algebra to solve complex network calculations in advanced circuit analysis.
   10. Apply the rules of algebra and trigonometry to both series and parallel resonance circuits.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
   1. Analyze and solve typical algebra problems utilizing recognized problem solving procedures
   2. Plot a curve on X-Y graph paper of two or more variables and interpret the meaning of the data represented.
   3. Solve right triangle trigonometry problems and apply these techniques to alternative current voltage, current and phase relationships.
   4. Define the difference between common and natural logarithms.
   5. Relate common and natural logarithms to exponential calculations and describe how logarithms are a superior method to solve these calculations.
   6. Apply common and natural logarithms to electronics calculations, such as gain/loss and charge/discharge measurements.
   7. Define the j-operator in electronics calculations and how it is applied to electronics circuit analysis.
   8. Define and contrast rectangular and polar notation and how they relate to j-operator calculations.
   9. Apply the rules of algebra to solve complex network calculations in advanced circuit analysis.
   10. Apply the rules of algebra and trigonometry to both series and parallel resonance circuits.

6. **COURSE CONTENT:**
   Lecture Content:
   1. Review of Algebra utilizing recognized problem solving procedures, including: linear, 2nd degree and quadratic equations; exponents and radicals; factoring; fractional equations; reduction of terms and expressions to simplest terms; and solving for values embedded within an equation. (Objective 1)
   2. Review of X-Y graphing techniques using two or more variables and interpretation of the data represented. (Objective 2)
   3. Review of trigonometric functions as applied to alternating current electronics circuits. (Objective 3)
   4. Use graphing to do comparative analysis of virtual circuits vs. actual circuits
   5. Definition of common and natural logarithms and their practical applications to electronics circuits.

(Objectives 4, 5, 6)
6. Analysis of complex alternating current circuits, using j-operators, rectangular and polar notation, and right triangle trigonometry. (Objectives 7, 8, 10)
7. Solution of complex network calculations in advanced electronic circuit analysis. (Objective 9)
8. Using Vpeak, Vpeak to Vpeak, and RMS voltages to do proper calculations on Center tap and Bridge Rectifier power supplies.
9. Using Augular Velocity and Augular Sweep in phasor / vector graphing
10. Converting and calculating Series and parallel inductive values in admittance, subseptance, and conductance.
11. Understand binary, octel and hexadecimal numbering systems for computing in machine language.
12. Using DeMorgans Theorem

TBA Hours Content:
N/A

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**
Typical methods of instruction may include:
   A. Other (Specify): Includes lecture and group discussion relating to the topics being considered. Weekly reading and homework will be assigned.

8. **REPRESENTATIVE ASSIGNMENTS**
Representative assignments in this course may include, but are not limited to the following:
Writing Assignments:
Weekly lab handouts and worksheets.
Reading Assignments:
Weekly reading assignments from text.

9. **REPRESENTATIVE METHODS OF EVALUATION**
Representative methods of evaluation may include:
   A. Class Participation
   B. Class Performance
   C. Class Work
   D. Exams/Tests
   E. Homework
   F. Lab Activities
   G. Evaluation will be based on satisfactory performance on homework activities, section tests and a final exam.

10. **REPRESENTATIVE TEXT(S):**
Possible textbooks include:
   A. Deem. *Electronics and Computer Mathematics*, 8th ed. -, 2006

Origination Date: November 2021
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Course Originator: Steven Gonzales