ENSC 245
Engineering Math Applications
3 Credits

Community College of Baltimore County
Common Course Outline

Description

ENSC 245 – Engineering Math Applications: introduces students to applications of mathematics related to electrical circuits such as sets and functions, discrete and continuous systems, matrices, and numerical computation algorithms. Emphasis is given to the fundamental concepts behind the mathematics as well as the application of the mathematics for problem solving and undertaking critical analysis of results, whether using a calculator or a computer. The course encompasses numerous exercises and examples firmly rooted in electrical engineering practice to ensure that all mathematical theory introduced is directly relevant to real world electrical and computer engineering.

Prerequisite: ELEI/ENSC 114
Co-requisite: MATH 259

Overall Course Objectives

Upon completion of this course, students will be able to:

1. generate equations needed to solve any general electric circuit;
2. calculate transient circuit responses for first and second order circuits;
3. generate transfer functions for circuits with one source;
4. use transfer functions to solve general transient problems;
5. differentiate between a continuous equation and a discrete equation;
6. identify limitations of numerical computation algorithms;
7. formulate matrix equations and solve;
8. calculate the eigenvalues and eigenvectors of a matrix;
9. utilize mathematical software for various calculations;
10. construct proofs using rules of logic; and
11. apply set theory, mathematical induction, combinations, and permutations.

Major Topics
  I.   Transient circuit responses
  II.   Transfer functions
  III.   Phasors
  IV.   Continuous and discrete equations
  V.   Numerical computation algorithms
  VI.   Matrices
  VII.   Gaussian elimination

VIII.   Asynchronous inputs
IX.   Digital arithmetic operations and circuits
X.   The Complement System of addition and subtraction
XI.   Counters and registers
XII.   Electrical characteristics and timing

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- 6 Homework Assignments
- 2 Exams
- Final Exam

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