

ESE 122 Discrete Mathematics for Engineers

Catalog Description:

Introduction to topics in computational mathematics, such as number systems, Boolean algebra, mathematical induction, combinatorics and probability, recursion and graph theory. Algorithm aspects of the topics discussed will be emphasized

Course Designation: Required course for Computer Engineering

Textbook: Discrete Mathematics with Applications by Susanna S. Epp
<https://www.amazon.com/Discrete-Mathematics-Applications-Susanna-Epp/dp/0495391328>

Prerequisites: Corequisite: ESE 123 for Computer Engineering Major

Course Learning Outcome: ability to apply knowledge of mathematics, science and engineering; an ability to identify, formulate, and solve engineering problems; an ability to use techniques, skills, and modern engineering tools necessary for engineering practice

Topics

1. Boolean Algebra and Set Theory (Useful in digital logic)
 - a. Logic
 - b. DeMorgan's Theorem
 - c. Logic Minimization and Logic Equivalency
 - d. Digital Logic Circuits (binary)
 - e. Number Systems and Circuits
2. Elementary Number Theory and Methods of Proof (Useful in programming) – 3 weeks
 - a. Mathematical Induction
 - b. Recursion/Divide and Conquer

Midterm #1

3. Counting and Probability
 - a. Combinatoric Analysis
 - b. Basic Probability
4. Functions and Relations – 2 weeks
 - a. Cardinality with Applications to Computability
 - b. Modular Arithmetic with Applications to Cryptography
 - c. Finite State Automata
5. Graphs and Trees
 - a. Structure
 - b. Representation

Midterm #2

6. Analysis of Algorithms Efficiency
 - a. Notations
 - b. Algorithm Analysis

Final

Grading: Homework: 25%
 Midterm 1: 20%
 Midterm 2: 20%
 Final: 35%