Math 245: Discrete Mathematics for Computer Science

COURSE LEARNING OUTCOMES

Students will be able to:

1. Write an argument using logical notation and determine if the argument is or is not valid.
2. Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described.
3. Understand the basic principles of sets and operations in sets.
4. Prove basic set equalities.
5. Apply counting principles to determine probabilities.
6. Demonstrate an understanding of relations and functions and be able to determine their properties.
7. Determine when a function is 1-1 and "onto".
8. Demonstrate different traversal methods for trees and graphs.
9. Model problems in Computer Science using graphs and trees.

Course Outline

I. Logic
   - A. Propositional Logic
   - B. Arguments
   - C. Methods of Proofs

II. Fundamentals
   - A. Sets and Operations
   - B. Proofs of Set Identities
   - C. Properties of the Integers
   - D. Matrices
   - E. Mathematical Structures

III. Counting Technique
   - A. Counting Principles
   - B. Permutations and Combinations
   - C. Probability

IV. Relations and Functions
   - A. Equivalence Relations
   - B. Functions
   - C. Operations on Functions

V. Graphs
   - A. Representation of Graphs
   - B. Directed and Indirected Graphs
   - C. Trees
   - D. Application of Graphs