

SYLLABUS

**1703.550 Topics in Discrete Mathematics**

**Catalog Description:**

**1703.550 Topics in Discrete Mathematics**

**3 s.h.**

This course studies concepts and techniques that are fundamental to mathematics and computer science. Selected topics are explored in depth from areas of set theory, logic, Boolean algebra, number systems, combinatorics, graph theory, complexity of algorithms, and data structure and representation. The course may not be offered annually.

**Objective:**

This course is intended to provide useful mathematical ideas, concepts and techniques that sharpen one's problem solving skills, and at the same time enable one to acquire a deeper understanding and appreciation of mathematics as a whole.

**Content:**

1. Sets Theory
  - Sets and Operations on Sets
  - Relations
  - Functions
2. Logic
  - Propositional Calculus
  - Logic Gates
  - Quantifiers
  - Methods of Proof (including Mathematical Induction)
3. Combinatorics
  - Basic counting techniques
  - Permutations and Combinations
  - Binomial Theorem
  - Distributions and Arrangements
  - Recurrence Relations and Generating Functions
  - Inclusion and Exclusion Principle
4. Graph Theory
  - Basic Concepts and Terminology
  - Trees
  - Applications to Computer Science

5. Analysis of Algorithms
  - Algorithms
  - Complexity and Order
6. Number Systems and Computer Codes
  - Binary, Octal and Hexadecimal arithmetic.

**TEXTS:**

- Roman, Steven, *AN INTRODUCTION TO DISCRETE MATHEMATICS*, Saunders HBJ, NY
- Ross, Kenneth, *DISCRETE MATHEMATICS*, Prentice Hall, NJ
- Anderson, James, *DISCRETE MATHEMATICS, WITH COMBINATORICS*, Prentice Hall, NJ
- Johnsonbaugh, Richard, *DISCRETE MATHEMATICS* (5<sup>th</sup> edition), Prentice Hall, NJ
- Goodaire, Edgar and Parmenter, Michael, *DISCRETE MATHEMATICS WITH GRAPH THEORY*, Prentice Hall, NJ

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