

# DISCRETE MATHEMATICS

## MATH 2030

### 1.0 Course Objectives

**1.1 Overview of Content and Purpose:** (3 hours) A foundations course in discrete mathematics for applied disciplines including computer science and computer engineering. Topics include: logic, sets, relations, functions, complexity functions and big-O, congruencies, induction and recursive definitions, elementary combinatorics, discrete probability, graphs, trees.

**1.2 For whom Intended:**

**1.3 Prerequisite:** MATH 1950 or MATH 1930

**1.3 Unusual Circumstances:** None

### 2.0 Objectives

**2.1 Performance Objectives for the Students:** The purpose of this course is to develop mathematical foundations for computer science and computer engineering. In addition, applications of mathematical principles to computer science and engineering are presented.

### 3.0 Content and Organization

- 3.1 Topics:**
1. Logic and Sets
    - a. Propositional Calculus
    - b. Predicates and Quantifiers
    - c. Sets and Set Operations
    - d. Applications to computer science and engineering
  2. Relations and Functions
    - a. Cartesian product
    - b. Equivalence relations and congruencies
    - c. Complexity functions and big-O
  3. Induction and Recursion
  4. Combinatorics
    - a. Fundamental Counting Principle
    - b. Combinations and Permutations
  5. Discrete Probability
    - a. Finite probability
    - b. Conditional probability
    - c. Random Variables and Distributions
  6. Graphs and Trees

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**4.0 Teaching Methodology**

- 4.1 Methods to be Used:** The course will be presented by lecture, class discussion and questions.

**5.0 Evaluation**

- 5.1 Basis for Evaluating Students Performances:** Evaluation will be based on examination results and outside projects including homework and/or computer projects. Approximate grading weights are 30% for final examination 40% for regularly scheduled tests, and 30% for homework and/or computer projects.

**6.0 Resource Material**

- 6.1 Textbook(s) or Other Required Readings:** Rosen, *Discrete Mathematics and its Applications*, ISBN 0-07-242434-6, McGraw Hill Publisher.
- 6.2 Current Bibliography Of resources:**