

**II/IV B. TECH. FIRST SEMESTER  
DISCRETE MATHEMATICS  
(Required)**

**Course Code : CS 3T1****Credits: 3****Lecture: 3 periods/week****Internal assessment: 30 Marks****Tutorial: 1period/week****Semester end examination: 70 Marks**

---

**Prerequisites: C Programming**

---

**Course Objectives:**

1. To know the notations used in the discrete mathematics associated with computer science and engineering.
2. To learn the rudiments of elementary mathematical reasoning (elementary proofs; proofs by induction, Normal forms)
3. To understand the theoretical parts of all further courses in Computer Sciences.
4. To understand the fundamentals of counting and discrete probability
5. To understand basic set-theoretical notions: relations, functions, graphs, equivalence relations, and orderings.

**Course Outcomes:**

At the end of this course student will:

CO1) Apply fundamentals of mathematical logic for proof techniques

CO2) Understand the concepts of partial ordering

CO3) Illustrate various types of trees and their applications

CO4) Demonstrate various types of graphs and its applications

**Syllabus:****UNIT I**

Statements and Notation, Connectives- Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Statement formulas and Truth Tables. Well formed formulas, Tautologies, equivalence of formulas, Duality Law, Tautological Implications, Functionally Complete Sets of Connectives, Other connectives.

**UNIT II**

Inference calculus - Derivation process - Conditional proof - Indirect method of proof- Automatic theorem proving - Predicate calculus.

**UNIT III**

Partial ordering – Lattices – Properties - Lattices as algebraic system - sub lattices - Direct product and homomorphism - Special lattices - Complemented and Distributive lattices.

**UNIT IV**

Graphs – Basic Concepts – isomorphism-sub graphs –Trees and Their Properties – Spanning Trees – Directed Trees – Binary Trees

**UNIT V**

Planar Graphs – Euler Graphs – Multigraphs and Euler Circuits – Hamiltonian Graphs – Chromatic Numbers – The Four – Colour Problem.

**Learning Resource****Text Books**

1. J P Trembly and R Manohar , Discrete Mathematical Structures with Applications to Computer Science. TMH
2. Joe L. Mott. Abraham Kandel and Theodore P.Baker, Discrete Mathematics for Computer Scientists & Mathematicians. PHI,Second Edition

**References**

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw-Hill Publishing Company, Pvt. Ltd., Fifth edition, New Delhi, 2003. 2. C.L. Liu, "Elements of Discrete Mathematics", Second edition, McGraw-Hill Book Company, New York, 1988.