

# Discrete Mathematical Structures - Video course

Mathematical reasoning; propositions; negation disjunction and conjunction; implication and equivalence; truth tables; predicates; quantifiers; natural deduction; rules of Inference; methods of proofs; use in program proving; resolution principle; application to PROLOG. (10 lectures)

Set theory; Paradoxes in set theory; inductive definition of sets and proof by induction; Peano postulates; Relations; representation of relations by graphs; properties of relations; equivalence relations and partitions; Partial orderings; Posets; Linear and well-ordered sets; (10 lectures)

Graph Theory; elements of graph theory, Euler graph, Hamiltonian path, trees, tree traversals, spanning trees; (4 lectures)

Functions; mappings; injection and surjections; composition of functions; inverse functions; special functions; Peano postulates; pigeonhole principle; recursive function theory; (6 lectures)

Definition and elementary properties of groups, semigroups, monoids, rings, fields, vector spaces and lattices; (4 lectures)

Elementary combinatorics; counting techniques; recurrence relation; generating functions; (6 lectures)

## Text Books

1. C.L.Liu, *Elements of Discrete Mathematics, second edition 1985, McGraw-Hill Book Company. Reprinted 2000.*

2. K.H.Rosen, *Discrete Mathematics and applications, fifth edition 2003, TataMcGraw Hill publishing Company.*

## Reference Books

1. J .L.Mott, A.Kandel, T.P .Baker, *Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India.*

2. W.K.Grassmann and J.P.Tremblay, *Logic and Discrete Mathematics, A Computer Science*



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