

## **Paper-V(MIT-105/MCA-105):Discrete Mathematics**

### **UNIT-I**

**Set Theory:** Introduction, sets and elements, universal set and empty set, subsets, venn diagram, set operations, algebra of sets and duality, finite sets, counting principle, classes of sets, power sets, partitions, mathematical induction.

**Relations:** Introduction, product set, relations, pictorial representation of relations, composition of relations, types of relations, closure properties, equivalence relations, partial ordering relations, n-ary relations.

### **UNIT-II**

**Functions:** One-to-one onto and invertible functions, mathematical functions, exponential and logarithmic functions, sequences, indexed classes of sets, recursively defined functions, cardinality.

**Logic and Propositional calculus:** Propositions and compound propositions, basic logical operations, propositions and truth tables, tautologies and contradictions, logical equivalence, algebra of proposition, conditional and bi-conditional statements, arguments, logical implication, propositional functions, quantifiers, negation of quantified statements.

### **UNIT-III**

**Matrices:** Matrix addition and scalar multiplication, matrix multiplication, transpose, square matrices, invertible matrices, inverse, determinants, elementary row operations, Gaussian elimination, boolean matrices.

### **UNIT-IV**

**Counting:** Basic counting principles, factorial notation, binomial coefficient, permutations, combinations, the pigeon-hole principle, the inclusion-exclusion principle, ordered and unordered partition.

**Probability Theory:** Introduction, Sample space and events, finite probability space, conditional probability, independent events, independent repeated trials, binomial distribution, random variables.

### **UNIT-V**

**Property of Integers:** Order and inequalities, absolute value, mathematical induction, division algorithm, divisibility, primes, greatest common divisor, Euclidean algorithm, fundamental theorem of arithmetic, congruence relation, congruence equations.

**Recommended Books :**

1. Lipschutz S., Lipson M. :Discrete Mathematics
2. Kolman B.,Robert C.B., Sharon R.: Discrete Mathematical Structures
3. Trembley J.P. and Manohar R.P. : Discrete Mathematical Structures with Applications to Computer Science.
4. Lew : Computer Science : A mathematical introduction