MCA Computational Mathematics Syllabus:

SYLLABUS ABSTRACT:

Mathematical Logic: Statement (Proposition), Logical Connectives, Conditional, Bi-conditional, Converse, Invers
Contradiction, Satisfiable, Duality Law, Algebra of propositions, Applications. Set Theory: Sets, Types of sets, Ca
set, Operations on sets, disjoint sets, application of set theory, Group theory: Groups, Subgroups, Cyclic groups, S
examples, Graph theory: Graphs, Computer Representations of Graphs, Isomorphic Graphs, Paths, Cycles and Cir
Directed acyclic graphs, Weighted Diagraphs, Trees, Spanning trees, Minimal Spanning Trees, Rooted Trees, Bin
Fundamental Counting Principles, Permutations, Combinations, Permutations and Combinations with Repetitions
dimensional random variable, Cdf, Mean, Variance, Problems.

Module-1
MATHEMATICAL LOGIC:
Statement (Proposition), Logical Connectives, Conditional, Bi-conditional, Converse, Inverse, Contra positive, Ex
Satisfiable, Duality Law, Algebra of propositions, Applications.
Module -2
SET THEORY:
Sets, Types of sets, Cardinality of a set, Subset and superset, Comparability of sets, Power set, Operations on sets,
Module – 3
GROUP THEORY:
Groups, Subgroups, Cyclic groups, Symmetric groups, Addition and multiplication modulo n over $\mathbb{Z}$ with exampl
Module-4
GRAPH THEORY:
Graphs, Computer Representations of Graphs, Isomorphic Graphs, Paths, Cycles and Circuits, Eulerian and Hami
graphs, Weighted Diagraphs, Trees, Spanning trees, Minimal Spanning Trees, Rooted Trees, Binary Trees, Binary
Module-5
COMBINATORICS AND PROBABILITY:
The Fundamental Counting Principles, Permutations, Combinations, Permutations and Combinations with Repetit
one-dimensional random variable, Cdf, Mean, Variance, Problems**.**

Text Books:
1. Thomas Koshy, *Discrete Mathematics with Applications*, Academic Press, Reprint 2005.
2. C. L. Liu, *Elements of Discrete Mathematics*, Mc Graw Hill, 1986.
3. J.P. Trembaly and R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science*, Mc Graw Hill, 1987.
4. P.L. Meyer, *Introduction to Probability and Statistical Applications*, Second Edition, Oxford and IBH Publishing, Delhi, 1980.

Reference Books:
1. D.P. Acharjya, Sreekumar, *Fundamental Approach to Discrete Mathematics*, New Age International (P) Limited, 2005.
2. Kenneth H Rosen, *Discrete Mathematics & its Applications with Combinatorics and Graph Theory*, 6th Edition, McGraw Hill, 2007.
3. Martin Aigne, *Discrete Mathematics*, American Mathematical Society, USA, 2007

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