

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

**CSE-Artificial Intelligence and Machine Learning/ Artificial Intelligence and Machine Learning
IV-Semester**

AL401 Introduction to Discrete Structure & Linear Algebra

Unit 1: Set Theory, Relation, Function, Theorem Proving Techniques: Set theory: definition of sets, Venn Diagram, proofs of some general identities on set, Relation: Definition, Types of relation, Composition of relation, Equivalence relation, Partial ordering relation, POSET, Hasse diagram and Lattice.

Unit 2: Algebraic structure: Definition, Properties, types: Semi Group, Monoid, Groups, Abelian Group, Properties of group, cyclic group, Normal subgroup, Ring and Fields: definition and standard result, Introduction to Recurrence Relation and Generating Functions.

Unit 3: Propositional logic: Proposition, First order Logic, Basic logical operation, Truth tables, Tautologies and Contradiction, algebra of proposition, logical implication, logical equivalence, predicates, Normal Forms, Quantifiers
Graph theory: Introduction and basic terminology of graph, types of graph, Path, Cycles, Shortest path in weighted graph, graph colorings.

Unit 4: Matrices: Determinant and Trace, Cholesky Decomposition, Eigen decomposition, Singular Value decomposition (SVD), Gradient of a matrix: Useful identities For computing Gradient.

Unit 5: Test of Hypothesis : Concept and Formulation, Type-I and Type-II Errors, Time Series Analysis, Analysis of Variance (ANOVA).

References:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Bisht, "Discrete Mathematics", Oxford University Press
5. Biswal, "Discrete Mathematics & Graph Theory", PHI
6. Mathematics For Machine Learning- Marc Peter Deisenroth, A. Aldo Faisal, Cheng soon ong
7. Statistical Method- S.P. Gupta