JYOTI NIVAS COLLEGE AUTONOMOUS
SYLLABUS FOR 2021 BATCH AND THEREAFTER
PROGRAMME: BCA
SEMESTER: I -DISCRETESTRUCTURES

NO. OF CREDITS: 3 **NO. OF HOURS: 45**

COURSE OUTCOMES (COS):

1. Describes and provides examples of set, relations and functions.
2. Analyse propositions and arguments in logic by truth tables.
3. Develop basic knowledge of matrices and solve a system of linear equations.
4. To find a matrix representation for the linear transformation
5.Describe the fundamental counting principle and determine possiblecombinations and permutations.
6.Able to define the basic concepts of graphs and the types of graphs,operations on Graphs, trees, paths, Planar graphs, Directed graphs,Digraphs, connectivity, orientation and Tournaments.
7. To find the Minimum Spanning Tree of a given graph using Prim's andKruskals' Algorithm.

UNITI **12 Hours**

Set Theory and Logic: Fundamentals of Set theory, Set Operations and the Laws of SetTheory, Counting and Venn Diagrams, Cartesian Products and Relations, Functions– One-to-One, Onto Functions, Function Composition and Inverse Functions. Mathematical Induction,Thewellorderingprinciple,RecursiveDefinitions,StructuralInduction,Recursivealgorithms.FundamentalsofLogic,PropositionalLogic,LogicalConnectivesandTruthTables, LogicEquivalence, Predicates and Quantifiers.

UNITII **11 Hours**

CountingandRelations: Basicsofcounting,PigeonholePrinciple,PermutationandCombinations,Binomialcoefficients.Recurrencerelations,Modelingwithrecurrencerelations with examples of Fibonacci numbers and the tower of Hanoi problem. Divide andConquerrelationswithexamples(notheorems).Definitionandtypesofrelations,Representingrelations using matrices and digraphs

UNITIII **11 Hours**

Matrices: Definition,orderofamatrix,typesofmatrices,operationsonmatrices,determinantofamatrix,inverseofamatrix,rankofamatrix,lineartransformations,applicationsof matrices to solvesystem of linearequations.

UNIT-IV **11 Hours**

GraphTheory-Graphs: Introduction,RepresentingGraphs,GraphIsomorphism,Operations

on graphs. **Trees:** Introduction, Applications of Trees, Tree Traversal, SpanningTrees, Minimum Spanning Trees, Prim's and Kruskul's Algorithms. Connectivity, Euler andHamilton Paths,PlanarGraphs.**Directedgraphs:**FundamentalsofDigraphs, ComputerRecognition - Zero-One Matrices and Directed Graphs, Out-degree, in-degree, connectivity,orientation,Eulerian andHamiltondirected graphs, tournaments.

TextBooks:

1. RalphP.Grimaldi:DiscreteandCombinatorialMathematics,5th Edition,PearsonEducatio n,2004.
2. C.L.Liu:Elements ofDiscreteMathematics, TataMcGraw-Hill,2000.
3. F.Harary:GraphTheory,AdditionWesley,1969.
4. RichardBronson,Schaum'sOutlineofMatrixOperations,McGraw-Hillpublications,2nd Edition, 2011.

ReferenceBooks:

1. Kenneth H Rosen. Discrete Mathematics and its Applications, McGraw-Hill publications,7th Edition,2007.
2. J. P. Tremblay and R.P. Manohar. Discrete Mathematical Structures with applications toComputerScience, McGraw Hill Ed.Inc. 1975.
3. CharlesGCullen.MatricesandLinearTransformations,DoverPublicationsInc.,SecondE dition, 1990.

WebResources:

1. https://www.my-mooc.com/en/categorie/mathematics.
2. http://www.nptelvideos.in/2012/11/discrete-mathematical-structures.html
3. https://ocw.mit.edu/courses/mathematics/