LOK JAGRUTI KENDRAUNIVERSITY

Syllabus for **LJ School of Computer Applications & Technology (Integrated)**

Semester- III

Course Code	**050120305**			
Category	**Interdisciplinary**			
Course Title	**Discrete Mathematics for Computer Science**			
Scheme and Credits	**Theory**	**Tutorial**	**Lab**	**Credits**
	3	**0**	**0**	**3**
Pre-requisites (if any)	______			

1. Course Objectives:

Sr.	Course Outcome (Learner will be able to)
1.	To understand the foundations of many basic mathematical topics used in Computer Science including RDBMS, Data Structures, Analysis of Algorithms, Theory of Computation, Cryptography, Artificial Intelligence, Statistics and others.
2.	To understand the concepts of basic algorithms related with Graphs and binary trees.

2. Course contents:

Module	Content	Weightage
Unit I	**Graphs:** Graph: Definition; Directed and undirected graphs; Loop (sling); Parallel edges; Simple graph, multi-graph; Weighted graph; Isolated node; Null graph; Isomorphism of graphs; In-degree, out-degree, total degree of a graph; Sub graph; Reflexive, symmetric, transitive, anti-symmetric graphs; Converse and directional dual of a diagraph; Path of a graph; Length of a path; Simple path (edge simple), elementary path (node simple); Cycle (circuit); Path of minimum length (geodesic); Reach ability; Reachable set; Node base; Connected graph – strongly connected, unilaterally connected, weakly connected; Sub graph generated by a given set; Maximal strongly (or unilaterally or weakly) connected sub graph; Matrix representation of graph; Adjacency matrix (A) of a graph; Deriving in (or out or total) degree from adjacency matrix; Path (reach ability)	**25%**
Unit II	**Tree:** Definition, root and leaf nodes; Directed tree; Weighted tree; Degree of node; Disjoint tree, forest; Full (complete) m-ary tree, binary tree; Different representations of trees; Conversion of m-ary tree into a binary tree; Binary tree representation of a forest ;	**15%**
Unit III	**Permutations, Combinations and Limits** **Permutations:** Apply the concept of permutation to solve simple problems, Solving problems based with restrictions on	**30%**

	permutations with restrictions **Combinations:** Define permutation, Define combination, Differentiate between permutation and combination, Apply the formula of combination to solve the related problems, Solve problems using combination with repetitions **Limit:** Define limit of a function, Solve problems based on the algebra of limits, Define continuity of a function	
Unit IV	**Differentiation and Integration** **Differentiation:** Definition of Derivative, Rules for Differentiation (without proof), Differentiation of composite functions, Higher order derivatives till order 2 **Integration:** Introduction to indefinite integral, Definition of Integration & Methods of integration, Substitution Methods, Standard Formulae (without proof) and example based on the standard forms	**30%**

Note: *Proofs of Theorems not required*

3. Desirable:

Introduction to definite integration and simple examples on it

4. Text Books:

1. Swapan Kumar Chakraborty, Bikash Kanti Sarkar "Discrete Mathematics "(Oxford Higher Education) (2011)
2. J.P.TremblayandR.Manohar,"DiscreteMathematicalStructureswithApplicationstoCom puterScience",TataMcGraw-Hill(2010)
3. BernardKolmann&others,"DiscreteMathematicalStructure",PearsonEducation,Sixth Edition
4. D.S. Malik & M. K. Sen, "Discrete Mathematics", Cengage Learning(2004)
5. D.C. Sancheti & V.K Kapoor , Business Mathematics (Latest Edition) Publisher : S. Chand and Sons Publications

5. Accomplishment of the student after completing the course:

1. This course will enhance the student's ability to think logically and mathematically.