Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
IT33	Discrete Structures	3	1	-	3	1	-	4
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60%weightage)		

Pre-requisite Course Codes		
After successful completion of the course, student will be able to:		
Course Outcomes	CO1	Make use of logic and various proof techniques to solve problems.
	CO2	Apply the concepts of set, relations to solve problems
	CO3	Apply the concepts of functions to various technical domains.
	CO4	Solve problems using graphs and trees.
	CO5	Use fundamental concepts of algebraic structures, lattice to solve problems

Module No.	Unit No.	Topics	Ref.	Hrs.
1	1	Logics and Proofs : Predicates, Quantifiers, Propositions, Conditional Propositions, Logical Connectivity, Proposition calculus, Universal and Existential Quantifiers, Equivalence, Normal Forms, Introduction to proofs, Mathematical Induction, Logical inference	1,2	06
2	2.1	Set theory:- Sets, Venn diagram, Operations on set, laws of set theory, partitions of set, types of sets , The principle of Inclusion and Exclusion	1,6	04
	2.2	Relations:- relations, equivalence relation, partial order relation, binary relation, Digraphs, posets and Hasse diagram, recurrence relation, Chains and Anti chains, theorems on chains, transitive closures, Warshall's algorithm	3,6	04

	2.3	Functions:- Injective, Surjective, Bijective, Inverse, Composiion, Identity, Graph of a function. Pigeon-hole principle	1	04
	2.4	Recursive function:- series, sequences, recurrence relation Applications – Divide-and-Conquer algorithm	1	03
3	**3.1**	Graphs:- Basic terminology, Eulerian graph, Bipartite graph, Hamiltonian graph, planar graph, subgraphs Isomorphism of graph and subgraphs, cliques, connected components, Maximum flow and minimal cut edges, Chromatic number, Graph color problem	4,6	04
	3.2	Applications of Graph theory:- maximum matching using augmenting paths, perfect matching in bipartite graphs, Chinese postman problem,	4,6	04
4	**4**	Trees:- weighted trees, spanning trees, minimum spanning trees, isomorphism of trees, Kruskal's algorithm for minimal spanning tree. Prim's algorithms for minimal spanning tree.	1,5	03
5	**5**	Algebric structures:- semigroup, monoids and groups, Isomorphism, Homomorphism, Automorphism Cyclic groups, Codes and group codes	1,3	05
6	**6**	Lattice theory: Lattices and algebras systems, principles of duality, basic properties of algebraic systems defined by lattices, distributive and complimented lattices, Boolean lattices and Boolean algebras, uniqueness of finite Boolean expressions, prepositional calculus, Coding theory: Coding of binary information and error detection, decoding and error correction	2,3	05
Total				42

References:

1. Kenneth H. Rosen "*Discrete Mathematics and it's applications*", 7th edition, Tata McGraw-Hill
2. Bernad Kolman, Robert Busby, Sharon Cutler Ross, Nadeem-ur-Rehman, "*Discrete Mathematical Structures*", 4th edition, Pearson Education.
3. C. L. Liu, "*Elements of Discrete Mathematics*", 2nd edition, Tata McGraw-Hill, 2002, ISBN: 0-07-043476-X.
4. Douglas B. West, "*Introduction to graph Theory*", 2nd edition, PHI publication.
5. Joe L. Mott, Abraham Kandel, Theodore P. Baker "*Discrete mathematics for computer scientists and mathematicians*", 2nd edition, Reston Publishing Company
6. S.K.Yadav, "*Discrete Mathematics and Graph Theory*" 1st edition, Anne Books Pvt. Ltd