UE18CS205
DISCRETE MATHEMATICS AND LOGIC (3-0-0-0-3)

Course Information

Unit	Hour	Portions to be covered	Percentage of portions covered	
			% of syllabus	Cumulative %
Unit 1 Logic T1: 1.1 - 1.5	1	Motivation, Propositional Logic - Basic Connectives and Truth Tables	24	24
	2	Propositional Logic - Conditional and Biconditional Statements		
	3	Propositional Logic - Tautology and Contradiction		
	4	Propositional Equivalences - Logical Equivalences		
	5	Propositional Equivalences - Laws of Logic		
	6	Predicates & Quantifiers		
	7	Nested Quantifiers		
	8	Rules of Inference		
	9	Rules of Inference		
	10	Arguments		
Unit 2 Sets, Functions and Relations T1: 2.1 - 2.3 7.1-7.3,7.5,7.6	11	Sets and Set Operations	17	41
	12	Functions		
	13	Relations and Their Properties		
	14	Representing Relations		
	15	Equivalence Relations and Classes		
	16	Partial Orderings		
	17	Hasse Diagrams, Lattices		
Unit 3 Counting T1: 5.1 – 5.4	18	Basic Counting Principles - The Sum and the Product Rules	17	58
	19	The Pigeonhole Principle		
	20	Applications of the Pigeonhole Principle		
	21	Permutations		
	22	Combinations		
	23	Binomial Coefficients and Binomial Theorem		
	24	Identities of the Binomial Coefficients		
Unit 4 Induction, Recursion and Recurrence	25	Mathematical Induction	19	77
	26	Strong Induction		
	27	Recurrence Relations		
	28	Modelling with Recurrence Relations		
	29	Graphs: Definition, The handshaking Theorem		

Relations,Graphs	30	Complete Graphs, Regular graph		
	31	Paths, Connectivity		
T1: 4.1 - 4.2 6.1 T1:Graphs 8.1 - 8.5	32	Euler and Hamilton Graphs		
Unit 5 Algebraic Structures T1: 11.1 - 11.7	33	The Structure of Algebras	24	100
	34	Semigroups, Monoids		
	35	Groups, Subgroups		
	36	Generators for a group		
	37	Cosets and Lagrange's Theorem		
	38	Isomorphisms and Automorphisms		
	39	Homomorphisms		
	40	Normal Subgroups & Congruence Relations		
	41	Coding Theory		
	42	Hamming Codes		

Pre-requisite Courses: None.

Reference Book(s):
1. "Discrete Mathematics and its Applications", Kenneth H Rosen, 7th Edition (Indian adaptation by Kamala Krithivasan), Tata McGraw-Hill, 2011.
2. "Discrete and Combinatorial Mathematics: An Applied Introduction", Grimaldi, Ramana, 5th Edition, Pearson, 2011.