

Theory syllabus		
Unit	Content	Hrs
1	Set Theory Introduction, Representation of Sets and Elements, Universal Set and Empty Set, Subsets, Equality of two sets, Equivalent sets, Power set, Disjoint set, Venn Diagrams, Set Operations: Union, Intersection, Difference, Symmetric difference, Compliment of a set, Cartesian product of two sets, Algebra laws of Set theory, Finite set, Infinite set and counting principle, Examples related to cardinality of sets.	15
2	Counting Introduction-Basic Counting Principles, Factorial Notation, Binomial Coefficients, Permutations, Combinations, The Pigeonhole Principle, Ordered and Unordered Partitions	10
3	Graph Theory Introduction, Konigsberg bridge problem, Data Structures, Graphs and Multigraphs, sub graphs, Finite graphs, Trivial Graph, Isomorphic and Homeomorphic Graphs, Paths Connectivity, Complete, Bipartite Graphs, Trees, Basics of tree in data structure.	20
4	Vectors and Metrics Introduction, Vectors Matrices, Unit matrix, Square matrix, Transpose of a Matrix, Invertible(Non-singular) Matrices, Zero matrix or Null Matrix, Row Matrix and Column Matrix, Symmetric Matrix, Skew Symmetric Matrix, Upper Triangular Matrix, Lower Triangular Matrix, Arithmetic Operations on Matrices : Addition, Subtraction and Multiplication of Matrices , Determinants, Elementary Row Operations, Gaussian Elimination	15
Practical Content:		
N.A.		
Text Books:		
1	Discrete Mathematics:- Seymour Lipschutz and Marc Lars Lipson Adapted By: Varsha H. Patil	
Reference Books:		
1	Advance Mathematics:- Heena Timani- Books India Publication	
2	Discrete Mathematics:- Babu Ram- Pearson Publication.	
Web References / MOOC / Certification Course		
1	https://nptel.ac.in/courses/111/107/111107058/	
2	https://www.coursera.org/lecture/mathematics-for-economists/1-2-operations-on-sets-HZ3aF	
Question Paper Scheme:		
	University Examination Duration:2 Hours Note for Examiner: Q-1 Must be common from any topics from the syllabus. Q-2 And onwards must be from specific topics and internal choice or option can be given. Paper Structure: Q-1 Must be from all Unit Any Five out of seven (25 Marks) [CO1, CO2, CO3, CO4] Q-2 Must be from Unit 1: Any Two out of Three (06 Marks) [CO1] Q-3 Must be from Unit 2: Only one question without any option (05 Marks) [CO2] Q-4 Must be from Unit 3: Any Two out of Three (08 Marks) [CO3] Q-5 Must be from Unit 4: Any Two out of Three (06 Marks) [CO4]	