

MSc IT 1st Semester

Subject Code : MS13

Subject Name : Discrete Mathematics

Block 1 – Sets & Logic

Unit 1- Introduction To Discrete Mathematics: Introduction, Sets And The Like, The Number Of Subsets, The Approximate Number Of Subsets, Sequences, Permutations, The Number Of Ordered Subsets.

Unit 2- Combinatorial Tools: Introduction, Induction, Comparing And Estimating Numbers, Inclusion-Exclusion, Pigeonholes, The Twin Paradox And The Good Old Logarithm.

Unit 3- Reflections on Logic and Proof: Introduction, Equivalence and Implication, Variables and Quantifiers, Quantifiers, Standard Notation For Quantification, Negation of Quantified statements.

Block 2 – Probability

Unit 1- Binomial Coefficients and Pascal's Triangle, Fibonacci Numbers: Introduction, The Binomial Theorem, Anagrams, Distributing Money, Pascal's Triangle, Identities In Pascal's Triangle, Fibonacci Numbers, Lots Of Identities.

Unit 2- Combinatorial Probability: Introduction, Events And Probabilities, Independent Repetition Of An Experiment, The Law Of Large Numbers, The Law Of Small Numbers And The Law Of Very Large Numbers, Divisibility Of Integers, Primes And Their History, Factorization Into Primes.

Unit 3- Combinatorics in Geometry: Introduction, Intersections of Diagonals, Counting Regions, Convex Polygons, Eulers Formula.

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Block 3 – Graphs & Coloring

Unit 1- Graphs: Introduction, Even And Odd Degrees, Paths, Cycles, And Connectivity, Eulerian Walks and Hamiltonian Cycles.

Unit 2- Coloring Maps and Graphs: Introduction, Coloring Regions With Two Colors, Coloring Graphs With Two Colors, Coloring Graphs With Many Colors, Map Coloring And The Four Color Theorem.

Unit 3- Finite Geometries, Codes & Latin Squares: Introduction, Finite Affine And Projective Planes, Block Designs, Codes.

Unit 4- Complexity And Cryptography: Introduction, Classical Cryptography, How To Verify A Password—Without Learning It, Public Key Cryptography.

Unit 5- Searching And Sorting: Introduction Record Keeping, Searching A Sorted File.