



Department of Mathematics

DISCRETE STRUCTURES (CS202)

Unit	Details
I	<p>Fundamentals of logic : Introduction, Basic connectives and Truth tables, Logical Equivalence, Logical Implication, Use of Quantifiers, Definitions and the Proof of Theorems</p> <p>Set theory: Sets and subsets, set Operations, Laws of Set Theory, Counting and Venn diagrams</p> <p>Properties of Integers: The well-ordering principle, Recursive definitions, the division algorithms, Fundamental theorem of arithmetic.</p>
II	<p>Relations and Functions: Cartesian Product, Functions onto Functions, Special Functions, Pigeon Hole Principle, Composition and Inverse Functions, Computational complexity</p> <p>Relations: Partial Orders, Equivalence Relations and Partitions</p> <p>Principle of Inclusion and Exclusion: Principle of Inclusion and Exclusion</p> <p>Generalization of Principle, Derangements, Rock Polynomials, Arrangements with Forbidden Positions, Characteristic functions</p>
III	<p>Generating Function: Definition and examples Partition of integers, Exponential generating function, Summation Operator</p> <p>Recurrence Relations: First-order linear recurrence relation second-order linear homogeneous recurrence relation with constant coefficients</p>

	Non homogeneous recurrence relation divide and conquer algorithm
IV	Algebraic Structures: Algebraic System , General Properties, semi groups, Monoids, Homomorphism Groups, Residue arithmetic Group codes and their applications
V	GRAPH THEORY Definitions and examples, sub graphs, complements and graph isomorphism, planar graph, Hamiltonian path, Graph coloring. Trees: Definition, properties, examples, Rooted Trees, Spanning Trees and Minimum Spanning Trees

Text/Reference Books:

T/R	Book Title/Authors/Publication
T1	Ralph P.Grimaldi, Discrete and Cominatorial Mathematics
T2	J.P.Trembly,R.Manohar, Discrete Mathematical Structure with Applications to Computer Science
R1	Joe L. Mott,A.Kandel,T.P.Baker,Discrete Mathematics for Computer Scientists & Mathematicians,