

**PESIT-BANGALORE SOUTH CAMPUS**

**Discrete Mathematical Structures–15CS36**

**COURSE INFORMATION**

**Name of faculty : Mrs. SatyaVani NL**

**No. of hours per week : 4**

**Total No. of classes : 52**

Sl. No.	Syllabus	% of Syllabus covered	
		Chapterwise	Cumulative
	<b>Module – 2 : Properties of the Integers</b>		
	Mathematical Induction, The Well Ordering Principle	20	20
	Recursive Definitions		
	The Rules of Sum and Product, Permutations,		
	Combinations , The Binomial Theorem,		
	Combinations with Repetition,		
	<b>Module – 3: Relations and Functions</b>		
	Cartesian Products and Relations	20	40
	Functions – Plain and One-to-One, Onto Functions		
	The Pigeon-hole Principle		
	Function Composition and Inverse Functions.		
	Zero-One Matrices and Directed Graphs,		
	Equivalence Relations and Partitions.		
	Partial Orders – Hasse Diagrams		
	<b>Module - 1 : Fundamentals of Logic:</b>		
	Basic Connectives and Truth Tables	20	60
	Logic Equivalence – The Laws of Logic		
	Logical Implication		
	Rules of Inference		
	The Use of Quantifiers		
	Quantifiers,		
	Definitions and the Proofs of Theorems		
	<b>Module - 4 : The Principle of Inclusion and Exclusion</b>		
	The Principle of Inclusion and Exclusion	20	80
	Generalizations of the Principle		
	Derangements – Nothing is in its Right Place		
	Rook Polynomials.		
	First Order Linear Recurrence Relation		
	The Second Order Linear Homogeneous Recurrence Relation with Constant Coefficients		
	<b>Module –5 : Introduction to Graph Theory</b>		
	Definitions and Examples, Sub graphs	20	100

	Complements, and Graph Isomorphism,		
	Vertex Degree, Euler Trails and Circuits		
	Trees: Definitions, Properties, and Examples,		
	Routed Trees, Trees and Sorting,		
	Weighted Trees and Prefix Codes		

## Course Outcomes:

After studying this course, students will be able to:

1. Verify the correctness of an argument using propositional and predicate logic and truth tables
2. Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.
3. Solve problems involving recurrence relations and generating functions.
4. Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
5. Explain and differentiate graphs and trees

<b>Textbooks</b>	<b>Title &amp; Author</b>
1.	<b>Ralph P. Grimaldi: Discrete and Combinatorial Mathematics, , 5th Edition, Pearson Education. 2004</b>

<b>Reference books</b>	<b>Title &amp; Author</b>
1.	Kenneth H. Rosen: Discrete Mathematics and its Applications, 6th Edition, McGraw Hill, 2007.
2.	Basavaraj S Anami and Venakanna S Madalli: Discrete Mathematics – A Concept based approach, Universities Press, 2016
3.	JayantGanguly: A Treatise on Discrete Mathematical Structures, Sanguine-Pearson, 2010
4.	Thomas Koshy: Discrete Mathematics with Applications, Elsevier, 2005, Reprint 2008.
5.	D.S. Malik and M.K. Sen: Discrete Mathematical Structures: Theory and Applications, Thomson, 2004