

**PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY, KANURU, VIJAYAWADA**  
**(AUTONOMOUS)**  
**INFORMATION TECHNOLOGY**  
**Engineering Mathematics III**  
**(Discrete Mathematical Structures)**  
**(Common to CSE & IT)**

<b>Course Code</b>	20BS1303	<b>Year</b>	II	<b>Semester</b>	I
<b>Course Category</b>	BS	<b>Branch</b>	IT	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Basic Mathematics
<b>Continuous Evaluation :</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

<b>Course Outcomes</b>		
Upon successful completion of the course, the student will be able to		
<b>CO1</b>	Understand the fundamental concepts of discrete mathematical structures	<b>L2</b>
<b>CO2</b>	Apply Normal forms/Rules of Inference for solving suitable problems.	<b>L3</b>
<b>CO3</b>	Apply the method of characteristic roots for solving different recurrence relations.	<b>L3</b>
<b>CO4</b>	Analyze various graph techniques to construct a tree.	<b>L4</b>

<b>Contribution of Course Outcomes towards achievement of Program Outcomes &amp; Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)</b>														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	3													
<b>CO2</b>	2									1				
<b>CO3</b>										1			2	
<b>CO4</b>		3							1	1				

Syllabus		
Unit No.	Contents	Mapped CO
I	<b>Mathematical Logic:</b> Introduction –Statements and Notations -Connectives (Negation, Conjunction, Disjunction )- Statement formulas and Truth Tables, Conditional and Bi-conditional, Well-Formed Formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implication, Functionally Complete Sets of Connectives, Other Connectives. <b>Normal Forms:</b> Disjunctive Normal Forms (DNF), Conjunctive Normal Forms (CNF), Principal of Disjunctive Normal Forms (PDNF), Principal of Conjunctive Normal Forms (PCNF).	CO1, CO2
II	<b>Theory of Inference for Statement Calculus:</b> Validity using Truth Tables- Rules of Inference – Consistency of Premises and Indirect Method Proof. <b>Predicate calculus:</b> Introduction to Predicates - Statement functions, Variable and Quantifiers - Predicate Formulas - Free and Bound Variables- Universe of Discourse.	CO1, CO2
III	<b>Recurrence Relations:</b> The Method of Characteristic Recurrence Relation. Roots – Solutions in Inhomogeneous	CO1, CO3
IV	<b>Relations and Directed Graphs:</b> Special Properties of Binary Relations- Equivalence Relations- Ordering Relations, Lattices, and Enumerations- Operations on Relations- Paths and Closures-Directed Graphs and Adjacency Matrices.	CO1, CO4
V	<b>Graphs:</b> Basic Concepts- Isomorphism's and Sub graphs-Trees and Their Properties - Spanning Trees-Planar Graphs-Euler's Formula- Multi-graphs and Euler Circuits-Hamiltonian Graphs- Chromatic Numbers.	CO1, CO4

Learning Resources
<b>Text Books</b>
1. Discrete Mathematical Structures with Applications to Computer Science, J P Trembly and R Manohar, 1988, McGraw-Hill ( <b>Unit-I,II</b> ) 2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott. Abraham Kandel and Theodore P. Baker, Second Edition, 2017, PHI. ( <b>Unit-III,IV,V</b> )
<b>References</b>
1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Seventh Edition, 2017, McGraw-Hill.
<b>e-Resources &amp; other digital material</b>
1. <a href="https://www.geeksforgeeks.org/engineering-mathematics-tutorials/">https://www.geeksforgeeks.org/engineering-mathematics-tutorials/</a> 2. <a href="https://www.tutorialspoint.com/discrete_mathematics/index.htm">https://www.tutorialspoint.com/discrete_mathematics/index.htm</a> 3. <a href="http://www.alas.matf.bg.ac.rs/~mi10164/Materijali/DS.pdf">http://www.alas.matf.bg.ac.rs/~mi10164/Materijali/DS.pdf</a> 4. <a href="https://nptel.ac.in/courses/111107058/">https://nptel.ac.in/courses/111107058/</a>