

Course Code	Course Title	C	H	I	E	T
17U2MMC4	Discrete Mathematics	4	4	25	75	100

### Unit I Set Theory

12 Hrs

Introduction – Sets and Elements – Universal Set and Empty Set – Subsets – Venn Diagrams – Set Operations – Algebra of Sets and Duality – Finite, Infinite Sets and Counting Principle – The Inclusion – Exclusion Principle – Classes of Sets, Power Sets, Partitions – Mathematical Induction – Multi Sets – Solved Problems.

### Unit II Relations and Functions

12 Hrs

Introduction – Product Sets – Relations – Pictorial Representations of Relations – Composition of Relations – Types of Relations – Closure Properties – Equivalence Relations – Partial Ordering Relations – n-ARY relations – Solved Problems.

**Functions:** Introduction – Functions – One-to-One, Onto, Invertible Functions – Mathematical, Exponential and Logarithmic Functions – Solved Problems

### Unit III Logic and Propositional Calculus

12 Hrs

Introduction – Propositions and Compound Propositions – Basic Logical Operators – Propositions and Truth Tables – Tautologies and Contradictions – Logical Equivalence – Algebra of Propositions – Conditional and Biconditional Statements – Arguments – Logical Implication – Propositional Functions, Quantifiers – Negation of Quantified Statements – Normal Forms – Solved Problems.

### Unit IV Matrix Theory

12 Hrs

Introduction – Algebra of Matrices – Types of Matrices – Inverse of a Matrix – Elementary transformation – Rank of a matrix – Consistency and Inconsistency of simultaneous linear equations using Matrices – Problems

### Unit V Characteristic Equation of Matrices

12 Hrs

Characteristic Equation of a Matrix – Cayley Hamilton theorem – Finding Powers and Inverse of a Matrix using Cayley Hamilton Theorem – Eigen Values and Eigen Vectors – Properties of Eigen Values and Eigen Vectors – Determination of Eigen Values and Eigen Vectors.

### Text Book(s):

1. Seymour Lipschutz and Marc Lars Lipson, Discrete Mathematics, 3<sup>rd</sup> Revised Edition (2013), Schaum's Outlines Tata McGraw Hill Education (India) Private Limited.  
**Chapters :** 1, 2(2.1-2.10), 3 (3.1-3.4) and 4 (For Units – I, II and III )
2. S. Arumugam and A. T. Issac, Modern Algebra, Reprint 2011, Scitech Publications.  
**Chapter:** 7 only (For Units – IV & V)

### Reference Books:

1. J. P. Tremblay and Manohar Discrete Mathematical Structures with Applications to Computer Science, 28<sup>th</sup> Reprint 2007, Tata McGraw – Hill Publications.
2. M. K. Venkatraman, N. Sridharan and N. Chandrasekaran, Discrete Mathematics, The National Publishing Company (2000).