SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
DEPARTMENT OF CS & IT

Semester/Year		III/II		Program		B.Tech – Internet of Things		
Subject Category	BSC	Subject Code:		MAB 204	Subject Name	Discrete Mathematics		

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical						
ES	MS	Assignment	Quiz	ES	LW	Quiz	Total Marks	L	T	P
60	20	10	10	-	-	-	100	3	1	0	4

Prerequisites:

Basic knowledge of mathematics**.**

Course Objective:

- Use mathematically correct terminology and notation.
- Construct correct direct and indirect proofs.
- Use division into cases in a proof.
- Use counterexamples.
- Apply logical reasoning to solve a variety of problems.

UNITs	Descriptions	Hrs.
I	Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic. Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.	8
II	Logics& Proofs: Syntax, Semantics, Validity and Satisfiability, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.	8
III	Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Free and Cyclic Monoids and Groups, Permutation Groups, Normal Subgroups.	10
IV	Substructures, Congruence Relation and Quotient Structures, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields.	6
V	Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points.	8
Total Hours		40

Course Outcomes:

CO-1: Define the fundamental discrete mathematical structures as basis of computer science.

CO2: Demonstrate the use of logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers.

CO-3: Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction.

CO-4: Define Algebraic Structures like group, ring, field and introduction to propositional logic.

CO-5: Analyse and Derive solutions for Graphs and Tree Problems.

Text Book & Reference Books-

1. C. L. Liu, "Elements of Discrete Mathematics", Tata McGraw-Hill Edition.
2. Trembley, J.P and Manohar, "Discrete Mathematical Structure with Application CS", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Lipschutz, "Discrete mathematics (Schaum)", TMH
5. Deo, Narsingh, "Graph Theory With application to Engineering and Computer Science", PHI.
6. Krishnamurthy V, "Combinatorics Theory and Application", East-West Press Pvt. Ltd., New Delhi.
7. S K Sarkar, "Discrete Mathematics", S. Chand Pub.

List/Links of e-learning resource

- https://nptel.ac.in/courses/106108227

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

COs	PO$_1$	PO$_2$	PO$_3$	PO$_4$	PO$_5$	PO$_6$	PO$_7$	PO$_8$	PO$_9$	PO$_1$	PO$_{11}$	PO$_{12}$	PSO1	PSO2
CO-1	1	1	2										1	2
CO-2	2	2	2										1	2
CO-3	2	1	2										1	2
CO-4	2	1	2											2
CO-5	2	2	1										1	2

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT