FACULTY OF COMPUTER APPLICATIONS
Bachelor of Computer Applications

- **Sem.** : 1
- **Subject Code** : 05BC1101
- **Subject** : Foundation of Mathematics -1
- **Course Objectives** :
    1. To enable students to obtain understanding of basic Mathematics concepts which can be applicable in various computer science problems.
    2. To enable students to understand concepts of Set Theory, Matrix Algebra and solve simple application problems based on these.
    3. To enable students to simplify and evaluate logical statement using different connectives.
    4. To enable to model real life situations of relations and functions.
    5. To enable students to understand concepts of graph theory.
- **Prerequisites** : None

Unit No	Topics Covered	No of lectures required
1	**Set Theory** Definition of Set, Representation of Set, Types of Set, Venn Diagram of Sets, Operation On Sets (Union , Intersection, Difference, Symmetric Difference, Complement of a set), Algebra of Sets (With Proof), De Morgan's Law (With Proof), Cartesian Product of Sets	10
2	**Propositional Logic :** Definition, Statement (Proposition) and Notation, Connectives (Conjunction, Disjunction, Negation, Implication, Bi–implication), Truth Table for all connectives, Statement Formulas, Truth tables, Tautology, Contradiction , Logical Equivalence, Validity of Arguments using truth table.	10

3	**Matrix Algebra** Introduction of Matrix, Types of Matrix, Scalar Multiplication of Matrix, Matrix Operations (Addition, subtraction, Multiplication), Properties of Matrix, Transpose of Matrix, Determinant of Matrix, Minor and Cofactors of a Matrix, Inverse of a matrix, Matrix Inversion Method to solve system of Linear equations, Cramer's rule to solve system of linear equations	10
4	**Relation And Function :** **Relation :** Introduction Of Relation, Types Of Relation (Reflexive, Irreflexive, Symmetric, Antisymmetric, Transitive), Equivalence Relation, Partial Ordering Set, Graphical and Matrix Representation of a relation **Function :** Definition of Function, Types of Functions (One – One Function, Onto Function, Bijective Function), Composition of Functions, Inverse of a function	10
5	**Graph Theory :** Basic concepts of graph theory (basic definitions and examples of Directed Graph, Undirected Graph, Mixed Graph, Directed edges, Undirected edges, adjacent nodes, loop, parallel edges, multi graph, simple graph, null graph), In degree, Out degree, Total degree of a node, Circuit, Path, Reachability, Connectedness (Strongly Connected, Unilaterally, Weakly Connected) of a graph.	10

Course Outcomes:

At the end of the syllabus students will able to understand

1. Able to apply concepts of set theory in problem solving
2. Enhance the students ability to think logically and mathematically
3. Able to apply concepts of matrix in real life problem.
4. Able to specify and manipulate basic mathematical objects such as relations and functions and their properties.
5. Able to understand and apply fundamentals of graph theory in solving problems.

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Text Book:

1. Business Mathmatics,V.K.Kapoor and D.C.Sancheti, Sultan Chand & Sons Publications , 11th Edition
2. "Discrete Mathematical Structures with Application to Computer Science", J.P. Trembly and R. Manohar , Tata McGrew – Hill, 2010

Reference Books:

1. Discrete Mathematics and its applications , K.H.Rosen,Tata McGrew – Hill , 6th Edition
2. Discrete Mathematical Structure ,Bernard Kolmann& others, Pearson Education , 6th Edition
3. "Discrete Mathematics", D.S.Malik&M.K.Sen, Cengage Learning, 2004

Web References:

1. www.uva.onlinejudge.org
2. www.cse.iitd.ernet.in/~bagchi/courses/discrete- book/fullbook.pdf

App References:

1. Matrix Operations : https://play.google.com/store/apps/details?id=ru.sssprog.matrixoperations&hl=en_US
2. Graph Theory Notes: https://play.google.com/store/apps/details?id=com.techzone.higher.graphtheory

Syllabus Coverage from text /reference book & web/app reference:

Unit No	Chapter Numbers
1	Text Book 1 Chapter 2
2	Text Book 2 Chapter 1 (1-1,1-2.1 to 1-2.4,1-2.6 to1-2.13)
3	Text Book 1 Chapter 20
4	Text Book 2 Chapter 2 (2-3.1 to 2-3.3 , 2-3.5 , 2-3.8 , 2-4.1 to 2-4.3)
5	Text Book 2 Chapter 5 (5 -1.1 to 5 -1.3)