Marwadi University

FACULTY OF COMPUTER APPLICATIONS

Bachelor of Science (Information Technology)
B.Sc. (IT)

- **Sem.** : 1
- **Subject Code** : 05BS0101
- **Subject** : Applied Mathematics – 1
- **Course Objectives** :
    1. To obtain understanding of basic Mathematics concepts of set theory this can be applicable in various computer science problems.
    2. To students to understand concepts of Matrix Algebra and solve simple application problems related to Computer Science based on these.
    3. To enable to model real life situations of relations and functions.
    4. To enable students to understand concepts of graph theory.
    5. To simplify and evaluate logical statement using different connectives.

- **Prerequisites** : None

Unit No	Topics Covered	No of lectures required
1	**Basic Set Theory** Definition of Set, Representation of Set, Types of Set, Cardinality of finite 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, Computer representation of Set theory.	**10**

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2	**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 , Properties of Determinant, Minor and Cofactors of a Matrix, Inverse of a matrix , Cramer's rule to solve system of linear equations	**10**
3	**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 , Partition and covering of set. **Function :** Definition of Function , Types of Functions (One – One Function , Onto Function , Bijective Function) , Composition of Functions, Inverse of a function	**10**
4	**Graph Theory :** Basic concepts of Graph theory, paths, circuits, walk, reachability and connectedness, matrix representation of graph, complement of graph , converse graph , degree of vertex , fundamental theorem of graph theory .	**10**
5	**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**

Course Outcomes :

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

Course Outcomes – Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	H						M			L
CO2	H						M			M
CO3	H							M		H
CO4	M	H						L		H
CO5	H									L

Text Book :

1. **Business Mathematics, 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**

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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=com.highermathematics.linearalgebra.free&hl=en_IN&gl=US]**
2. **Graph-Theory [https://play.google.com/store/apps/details?id=com.do_apps.catalog_602&hl=en_IN&gl=US]**

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

Unit #	Chapter Numbers
1	Ch2 (Book 1)
2	Ch20 (Book 1)
3	2-3.1 to 2-3.3 , 2-3.5 , 2-3.8 , 2-4.1 to 2-4.3 (Book 2)
4	5 -1.1 to 5 -1.3 (Book 2)
5	1-1,1-2.1 to 1-2.4,1-2.6 to1-2.13 (Book 2)

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