|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 13CS2101 | - | | MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE | | | | |
|  |  | |  | | | | |
| Hours / Week | : | 4 | |  | Sessional Marks | : | 40 |
| Credits | : | 4 | |  | End Examination Marks | : | 60 |

|  |
| --- |
| **UNIT – I** |
| **Mathematical Logic**: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. **Predicates**: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving. |
|  |
| **UNIT – II** |
| **Relations**: Properties of binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. **Functions**: Inverse Function, Composition of functions, Lattice and its Properties. |
|  |
| **UNIT – III** |
| **Algebraic Structures**: Algebraic systems, Examples and general properties, Semi groups and monoids, groups, and sub groups, homomorphism, Isomorphism.  **Elementary Combinatorics**: Basics of counting, Combinations & Permutations, Binomial and Multinomial theorems, Pigeon-hole principle and its applications. |
|  |
| **UNIT – IV** |
| **Recurrence Relations**: Generating Functions, Function of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, the method of Characteristic roots, solution of Inhomogeneous Recurrence Relations. |
|  |
| **UNIT – V** |
| **Graph Theory And Applications**: Basic Concepts, Representation of Graphs, cut vertices and edges, covering , matching, independent sets, Planar Graphs, Isomorphism and Sub graphs, DFS, BFS, Spanning Trees, Multi graphs and Euler circuits, Hamiltonian graphs, Graph coloring. |
|  |
|  |
| TEXT BOOKS |
| 1. Discrete Mathematical Structures with Applications to Computer Science, J.P.Tremblay, R.Manohar, Mc.Grahill, 2001. 2. Discrete Mathematics and its Applications, Kenneth H.Rosen, 6th edition, TMH. 3. Mathematical Foundations of Computer Science, P.Chandrasekharaiah, Prism publications. |
|  |
| REFERENCE BOOKS |
| 1. Discrete Mathematics for Computer Scientists & Mathematicians, second edition, J.L.Mott, A. Kandel, T.P. Baker, PHI 2. Discrete Mathematical Structures, Mallik and Sen, CengageLearning. 3. Discrete Mathematical Structures, Bernand Kolman, Robert C. Busby, Sharon Cutler Ross, PHI/ Pearson Education. |