BCA (HONS) 2nd SEMESTER
DSC (CORE)

BCA221C1: DISCRETE STRUCTURES

CREDITS: THEORY: 4, TUTORIAL: 2
LECTURES: THEORY: 60; TUTORIAL: 30

UNIT-I

1. **Introduction: (15 Lectures)**

Sets - finite and infinite sets, Uncountably Infinite Sets; functions, relations, Properties of Binary Relations, Closure, Partial Ordering Relations; counting - Pigeonhole Principle, Permutation and Combination; Mathematical Induction, Principle of Inclusion and Exclusion.

UNIT-II

2. **Growth of Functions: (8 Lectures)**

Asymptotic Notations, Summation formulas and properties, Bounding Summations, approximation by Integrals

3. **Recurrences: (7 Lectures)**

Recurrence Relations, generating functions, Linear Recurrence Relations with constant coefficients and their solution, Substitution Method, Recurrence Trees, Master Theorem

UNIT-III

4. **Graph Theory (15 Lectures)**

Basic Terminology, Models and Types, multigraphs and weighted graphs, Graph Representation, Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring, Trees, Basic Terminology and properties of Trees, Introduction to Spanning Trees

UNIT-IV

5. **Prepositional Logic (15 Lectures)**

Logical Connectives, Well-formed Formulas, Tautologies, Equivalences, Inference Theory.

TUTORIAL: 30 LECTURES (2 CREDITS): BASED ON UNITS I to IV ABOVE

RECOMMENDED BOOKS:

1. C.L. Liu, D.P. Mahopatra, Elements of Discrete mathematics, 2nd Edition, Tata McGraw Hill, 1985.
2. Kenneth Rosen, Discrete Mathematics and Its Applications, Sixth Edition ,McGraw Hill 2006
3. T.H. Coremen, C.E. Leiserson, R. L. Rivest, Introduction to algorithms, 3rd edition Prentice Hall on India, 2009.
4. M. O. Albertson and J. P. Hutchinson, Discrete Mathematics with Algorithms, John Wiley Publication, 1988.
5. J. L. Hein, Discrete Structures, Logic, and Computability, 3rd Edition, Jones and Bartlett Publishers, 2009.
6. D.J. Hunter, Essentials of Discrete Mathematics, Jones and Bartlett Publishers, 2008.