MAT-SEC-106: Discrete Mathematics

Credits: 3 (L=3, T=0, P=0) **Total hours: 45 (Theory=45)**

Total Marks: 75 (Including Internal Assessment= 15) **Time Allowed for Examination: 3hrs.**

Instructions for the Candidates and Paper Setters

Candidates will be asked to attempt ve questions out of nine, carrying equal marks. Question No 1 spread

over the whole syllabus will be compulsory.

There will be two questions from each unit and the students will have to attempt one from each unit.

Course Outcome: The objective of this course is to acquaint the students with the basic concepts in Discrete Mathematics and Graph Theory.

Unit I

Pigeonhole principle, Basic counting principles, permutations and combinations of sets and multi sets, Binomial and multinomial theorems, combinatorial identities, inclusion and exclusion principle.

Unit II

Recurrence relation, Generating functions solution of recurrence relations using di erence equations and generating functions, Catalan numbers, Sterling numbers.

Unit III

Elements of Graph Theory, Eulerian and Hamiltonian trails and cycles. Bipartite multigraphs, Trees, Planer graphs, Euler formula.

Unit IV

Spanning Trees, Prim's Algorithm for generating minimum weight spanning graphs, Digraphs, and Chromatic numbers.

Essential Textbooks

(A) R. A. Brualdi, Introductory Combinatorics, 5th Ed, Pearson, 2010

Further Readings

1. M K Gupta, Discreate Mathematics, Krishna Publications, 2019
2. J. L. Mott, Kandel and T. P. Baker, Discrete Mathematics for Computer Scientists and Mathematicians, Prentice Hall, 1986

MAT-SEC-156: Working with Mathematical Softwares (Mathematica/Matlab/Octave/Maple)

Unit IV