Tribhuvan University
Institute of Science and Technology
Course of Study for Four Year Mathematics

Course Title: Discrete Mathematics **Full Marks:** 50
Course No. : Math 304 **Pass Mark: 3**5%
Level : B.Sc. **Year:** III
Nature of Course: Theory (Elective)
Period per week: 3 theory + 2 problem classes

Course Objectives: The course aims to familiarize students with the knowledge of graph theory. The basic purpose of this course is to enable students to understand and apply basic discrete mathematics techniques based on graph theory.
Course Description: This course deals with discrete mathematics basically focused to graph theory for undergraduate students as an elective course.
Course Contents:

Unit 1. Fundamentals:
Sets; Set Operations; Functions; Sequences and Summations; Cardinality of Sets; Matrices ; Algorithms; Complexity of Algorithms

Unit 2. Relations:
Relations and Their Properties; *n*-ary Relations and Their Applications; Representing Relations; Closures of Relations; Equivalence Relations; . Partial Orderings

Unit 3. Graphs:
Graphs and Graph Models; Graph Terminology and Special Types of Graphs; Representing Graphs and Graph Isomorphism; Connectivity; Euler and Hamilton Paths; Shortest-Path Problems; Planar Graph

Unit 4. Trees:
Introduction to Trees; Applications of Trees; Tree Traversal; Spanning Trees

Unit 5. Network Flows:
Graphs as models of flow; Folws; Maximal Flows and Minimum Cuts; Maximum Flow-Min Cut Theorem

References:

1. Kenneth H. Rosen, *Discrete Mathematics and its Applications*, Tata McGraw-Hill Publishing company Limited, 7th Edition
2. Joe L. Mott, Abraham Kandel and Theodore P. Baker, *Discrete Mathematics for Computer Scientists and Mathematicians*, Prentice-Hall of India, 2nd Edition