# Department Of Computer Science and Engineering
# Kathmandu University
# Dhulikhel, Kavre

**Subject: Discrete Mathematics**          **Course: MCSC – 201**

**Level: B.Sc/2nd Year/1st Semester**          **Credit Hours: 3**

**Course Description:** The course attempts to provide discrete methods that stress in many problems and structures of computer engineering. The course includes concepts of Logic, Relations and digraph, Graph theory and Algebraic structure.

**Course Objectives:** Broadly, the following are the objectives of this course
- Development of conceptual ideas on the topics.
- Imparting problem solving skills.

Internal Exam : 25 marks
End Semester Evaluation: 75 marks
       Objective 20 marks (10 marks fill in the blank and 10 marks for multiple choices)
       Subjective 55 marks (Long answer questions 3 Q. $\times$ 7 = 21 marks;
       Short answer questions 6 Q. $\times$ 4 = 24 marks;
       Very short answer questions 5 Q $\times$ 2 = 10 marks;)

1. **Fundamentals [5]**
   - Algebra on Sets, Sequences, Integers and divisibility, Boolean Matrices, Mathematical structures

2. **Logic [8]**
   - Propositions and Logical Operations, Conditional Statements, Methods of Proof, Mathematical induction, Pigeonhole Principle

3. **Relations and Diagraphs [8]**
   - Product Sets and Partitions, Relations and Diagraphs, Paths in Relations and Diagraphs, Properties of Relations, Equivalence Relations, Operations on Relations

4. **Functions [4]**
   - Introduction of Functions, Functions for Computer Science, Permutation Functions

5. **Order Relations and Structures [6]**
   ● Partially Ordered Sets, Extremal Elements of Partially Ordered Sets, Lattices, Finite Boolean Algebras

6. **Graph Theory [9]**
   ● Introduction of Graphs, Subgraphs and Quotient graphs, Euler Paths and circuits, Hamiltonian paths and circuits, Transport Networks.

7. **Semigroups and Groups [8]**
   ● Binary Operations, Semigroups, Product and Quotients of Semigroup, Groups, Products and Quotients of Groups, Other Mathematical Structures

**Text Book:**
1. B. Kolman, R. C. Busby and S. C. Ross, Discrete Mathematical Structure, 6th Edition, PHI, New Delhi.

**References:**
1. K. Rossen, Discrete Mathematics and Its Applications, 7th Edition, Tata McGrawHill, New Delhi.
2. R. P. Grimaldi, Discrete and Combinatorial Mathematics, Pearson Education