Discrete Mathematics

Dinessh Naik

Manjunath K Vanahalli

Department of Information Technology,
National Institute of Technology Karnataka, India

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Syllabus

- **Mathematical Logic and Proofs:** - Propositional Logic and Applications, Operations on Propositions, Truth Tables, Tautologies and Logical Equivalence, Predicate Logic, Predicates and Quantifiers, Nested Quantifiers, Inference Rules, Proof Methods

- **Set Theory:** - Sets/Operations, Sequences/Summations, Cardinality of Sets, Functions (Surjections, Injections)

- **Induction and Recursion:** – Mathematical Induction, Strong Induction and Well-ordering, Recursive Definitions, Structural Induction

Syllabus

- **Combinatorics:** – Counting, Pigeonhole Principle, Permutations / Combinations, Binomial Coefficients, Recurrence Relations, Generating Functions, Inclusion-Exclusion

- **Relations:** – n-ary Relations and Applications, Representing Relations, Closure of Relations, Equivalence Relations, Partial Orders

- **Group Theory:** Groups, Semi-groups, Monoids, Rings, Fields, Vector Spaces and Lattices

- **Group Theory:** – Graphs Models, Euler and Hamiltonian Paths, Trees, Tree Traversals, Spanning Trees, Graph matching, Graph coloring

Details

- Course Code: IT-203
- Course Name: Discrete Mathematics
- (L-T-P): (3-0-0) 3

- Evaluation Criteria:
    - Mid Sem Exam $= 20\%$
    - Assignments $= 10\%$
    - Quiz$=15\%$
    - Mini-Project$=25\%$
    - End Sem Exam $= 30\%$

Reference Books

- C.L.Liu, Elements of Discrete Mathematics, second edition 1985, McGraw-Hill Book Company. Reprinted 2000.

- John A. Dossey, Discrete Mathematics, 5th Edition, Pearson, 2011.

- Jean-Paul Tremblay and R Manohar, Discrete Mathematical Structures and Apps., 1st Ed, McGraw-Hill, 2017.

- J .L.Mott, A.Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India.

- K.H.Rosen, Discrete Mathematics and applications, fifth edition 2003, TataMcGraw Hill publishing Company.