

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR B.Sc. (MATHEMATICS for Computer Science)
SEMESTER - IV
MCS - 401
(Graph Theory)

Effective from July 2015

Marks: 100 (30 internal + 70 external)
(3 Hours / Week - Credits : 3)

Unit 1:

Graph, undirected and directed graph, types of graph, simple graph, Multigraph, pseudo graph, self-loop, parallel edges, degree of vertex.
Applications of graph: Königsberg bridge problem, Utility problem, seating problem, walk, path, circuit, planar graph, non-planar graph, Matrix representation of graph.

Unit 2:

Handshaking theorem, connected graph, components of graph, Complete graph, Regular graph, edge connectivity of graph, Regions, Euler's path and circuit, Euler's formula for regions of planar graph, weighted graph.

Unit 3:

Operations of graph (union, intersection, sum, ring sum, complement, product, composition, fusion), Subgraphs and isomorphic graphs, reachability and connectedness in undirected graphs, Hamiltonian paths and circuits.

Unit 4:

Trees and its properties, rooted tree, Binary tree, properties of binary trees, spanning tree, Minimal spanning tree, Prim's algorithm to construct minimal spanning tree.

The course is covered by the following reference books :

1. A textbook of Discrete Mathematics: S. K. Sarkar, S. Chand & Company Ltd.
2. Narsingh Deo: Graph Theory with applications to Engineering and Computer Science, PHI, New Delhi.
3. J. P. Trambley and R. Manohar: Discrete Mathematical Structures with applications to computer Science, Mc Graw International Ed.
4. Discrete Mathematics: B. S. Vatsava, Wishva Prakashan, Delhi.
5. Olympia Nicodemi : Discrete Mathematics, CBS-Publisher and Distributor, Delhi.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR B.Sc. (MATHEMATICS for Computer Science)
SEMESTER - IV
MCS - 402

(Discrete Mathematics - II)

Effective from July 2015

Marks:100 (30 internal + 70 external)

(3 Hours / Week - Credits : 3)

Unit 1:

Basic properties of congruence, Modular Arithmetic, Divisibility tests of 9 and 11 and their use to compute missing digits in a calculations, Computation of the solutions of linear congruence $ax \equiv b \pmod{n}$.

Introduction of Euler's Totient function $\phi(n)$, Applications of Fermat's little theorem and Euler's Theorem.

Unit 2:

Partial order relation, Partially ordered set, Hasse diagram, Well ordered set, Totally ordered set.

Lattices, Properties of Lattices, Lattice Homomorphism, Sub lattices, Complete lattice, modular lattice, Isomorphic Lattice, Bounded Lattice, Distributive Lattice, Complemented Lattice.

Unit 3:

Boolean algebra, Properties of Boolean algebra, Sub Boolean algebra, Boolean homomorphism, Boolean functions, Boolean expressions, equivalence of Boolean expressions and Boolean functions.

Unit 4:

Sum of product canonical forms, product of sum canonical forms, Symmetric expressions, minimization of Boolean functions by Karnaugh map method.

The course is covered by the following reference books :

1. David M. Burton : Elementary Number Theory, McGraw Hill Edu (India) Pvt. Ltd., N. Delhi, 7th Ed., 2012.
2. S. K. Sarkar: A textbook of Discrete Mathematics, S. Chand & Company Ltd.
3. Bernard Kolman et al: Discrete Mathematical Structures, Prentice- Hall of India
4. J. P. Tremblay and R. Manohar: Discrete Mathematical Structures with applications to Computer Science, McGraw International Ed.
5. B. S. Vatsava: Discrete Mathematics, Wishva Prakashan, Delhi
6. K. D. Joshi: Foundations of Discrete Mathematics, Wiley Eastern limited.

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SYLLABUS FOR B.Sc. (MATHEMATICS for Computer Science)
SEMESTER - IV

MCS - 403

(Differential Equations - II)

Effective from July 2015

Marks:100 (30 internal + 70 external)

(3 Hours / Week - Credits : 3)

Unit 1:

Difference Equations, Linear difference equations, homogeneous difference equations, solution of homogeneous difference equations with constant coefficients.

Unit 2:

Formation of Partial differential equations by the elimination of arbitrary constants and arbitrary functions, solution of PDE by direct integration, Lagrange's linear Partial Differential equations of the first order, Solution of PDE by the method of multipliers.

Unit 3:

Types of partial differential equations, solution of partial differential equations by method of separation of variables.

Unit 4:

Solution of homogeneous linear partial differential equations with constant coefficients.

The course is covered by the following reference books :

1. Gupta, Malik & Mittal: Ordinary Differential Equations, Pragati Prakashan, Meerut.
2. D. A. Murray: Introductory Course of Diff. equations, Orient Longman (2nd ed.).
3. N. P. Bhamore & et al: Mathematics Paper III-IV, Popular Prakashan, Surat.
4. I. N. Sneddon : Elements of Partial Diff. Equations, McGraw Hill Book Co.
5. H. K. Dass: Advanced Engineering Mathematics, S. Chand & Company, New Delhi.
6. S. L. Ross : Differential equations, John Wiley and Sons., 1984.

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