VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR M.Sc. (I.T.) (UG)
SEMESTER-2
Course : 202 : Mathematics-2
Effective from June- 2021
(4 Hours/Week, Credits : 4)

O/. Charge

Minimum weeks per semester: 15 (Including class work, examination, preparation, holidays etc)

Purpose of course : Students will be able to explain and apply the basic methods of mathematics.

Course objective : To develop logical sequence in the design and analysis of algorithm, computability theory, software engineering and computer systems.

Pre-requisite : Basics of Mathematics

Course Outcome : Students will be equipped with logic to develop design and analysis of algorithm, computability theory, software engineering and computer systems.

Teaching Methodology : Lectures, Discussion, Independent Study, Seminars and Assignments.

Evaluation Method : 30% Internal assessment and 70% External assessment.

Course Content :

Unit 1: Basic concept of Graph Theory :
1.1 What is graph?
1.2 Application of Graphs
1.3 Directed graph
1.4 Finite and Infinite graphs
1.5 Incidence and Degree
1.6 Isolated vertex, Pendent vertex and Null graph
1.7 Simple graph
1.8 Regular graph

Unit 2 : Paths and Circuits :
2.2 Isomorphism
2.2 Sub graphs
2.3 A puzzle with Multicolored cubes
2.4 Walks, Paths and Circuits
2.5 Connected graphs, disconnected graphs and Components. Decomposition
2.6 Euler graphs, Universal graph
2.7 Operations on graphs –Union, Intersection, Ring sum
2.8 Complete graph
2.9 Hamiltonian paths and Circuits
2.10 Seating arrangement problems
2.11 The travelling Salesman problem

Unit 3 : Trees and Fundamental Circuits :
3.1 Trees
3.2 Some properties of trees

3.3 Pendent Vertices in a tree
3.4 Distance and Centers in a tree
3.5 Rooted and Binary trees
3.6 On counting trees
3.7 Spanning trees
3.7.1 Finding all Spanning trees of graph
3.8 Fundamental circuits
3.9 Spanning tree in a Weighted graph

Unit 4 : Planar graphs :
4.1 Combinatorial vs Geometric graphs
4.2 Planar graphs
4.3 Non–Planar graphs
4.3 Kuratowski's $K_{3,3}$ and K_5 graphs.
4.4 Different representation of planar graph

Unit 5 : Matrix representation of graphs :
5.1 Incidence matrix
5.2 Sub matrices of A(G)
5.4 Path matrix
5.5 Adjacency matrix.

Reference Books :

1. Narsinh Deo : Graph Theory with applications to engineering and computer Science, Prentice – Hall Inc. (2005).
2. B. Satyanarayan, K.S. Prasad : Discrete Mathematics & Graph Theory, PHI (2009).
3. R.Manohar, Trembly J.P.: Discrete Mathematical structure with application to Computer Science, TMH, 1999.
4. Wilson R.J.: Introduction to Graph Theory, 3rd edition, Longmann, 1984.
5. Gibbons A.: Algorithmic Graph Theory, Cambridge University Press, 1984.
6. Harry F.: Graph Theory, Narosa Publication, 1995.
7. Richard J.: Discrete Mathematics, Pearson Educations, Asia, 2001.