Enclosure –XIB

Shree Manibhai Virani & Smt. Navalben Virani Science College, Rajkot
(Autonomous)
Affiliated to Saurashtra University, Rajkot.

DSE-ID Course for M.Sc. Information Technology & Computer Application
For Students Admitted From A.Y. 2019-2020 & Onwards

Semester II			
Course Code	**Course title**	**Course hrs.**	**Credit**
19PITID202	**Core 4:Graph Theory**	**04 hrs/wk**	**04 Credits**

Course Description:

This course will cover the fundamental concepts of Graph Theory: simple graphs, digraphs, Eulerian and Hamiltonian graphs, trees, matchings, networks, paths and cycles, graph colorings, and planar graphs. Famous problems in Graph Theory include: Minimum Connector Problem (building roads at minimum cost), the Marriage Problem (matching men and women into compatible pairs), the Assignment Problem (filling n jobs in the best way), and the Traveling Salesman Problem (visiting n cities with minimum cost).

Course Purpose:

Upon completion of the course students will be able to

1. Understand the fundamental concepts of graphs.
2. Characterize the Euler and Hamiltonian Graphs.
3. Understand and apply the Kruskel's and Prim's algorithm.
4. Determine the planarity of the given graph.
5. Understand the concept of graph coloring.

Course Outcomes: Upon completion of this course, the learner will be able to		
CO No.	**CO Statement**	**Blooms taxonomy Level (K_1 to K_6)**
CO_1	Solve problems using basic graph theory	K3
CO_2	Identify whether graphs are Hamiltonian and/or Eulerian	K1
CO_3	Formulate graph theoretic models to solve real world problems	K3
CO_4	Use of algorithms to solve the problem	K6
CO_5	The students will be able to apply principles and concepts of graph	K3

	theory in practical situations	

Course Content	Hours
Module-I :	**10 hrs**
• A quick review of Graph • Degree of a vertex • Path • Circuit • Connected and disconnected graphs • Components	
Module-II: Euler Tour and Hamiltonian Cycles	**09 hrs**
• Euler trail, Euler tour, Euler Graph • Characterizations of Eulerian graph • Hamiltonian paths and cycles. • Chinese Postman Problem • The Travelling Salesman Problem	
Module-III: Tree and Connectivity	**10 hrs**
• Trees and their properties • Bridges • Spanning trees • Minimal spanning Tree • Connector Problem • Shortest Path Problem	
Module-IV: Matchings	**10 hrs**
• Matching and augmenting path • The Marriage Problem • Personal assignment problem • The optimal assignment	
Module-V:Algotithms in graph	**09hrs**
• Prim's Algorithm to find minimal spanning tree • Krushkal's Algotithm to find minimal spanning tree • Dijkstra's Algorithm to find shortest path	

Suggested laboratory experiments:
• NA

Pedagogic tools:
• Chalk and Board, direct explanation. • Power point presentation, LCD and Videos.

Reference Books:
1. A first Look at Graph Theory by Clerk and Holton- World Scientific 2. Graph theory by F. Harary – Addision – Wesley 1969 3. Introduction to Graph theory by R. J. Wilson, Pearson Education Asia (Low Price). 4. R. J. Willson & J. J. Walkms: Graphs: An introductory approach wiley, 1990.

Laboratory Manual/ Book
• Not applicable.

Suggested reading / E-resources
• https://www.khanacademy.org/science/organic-chemistry/stereochemistry-topic
Suggested MOOCs
• Algorithms on Graphs-Coursera • Introduction to graph theory- Class central

Methods of assessing the Course Outcomes The COs of the course will be assessed through
• Continuous Internal Assessment
• Semester End Evaluation

Component of CIA:

S. No.	CIA Component	Content	Duration	Marks	Marks
a)	**Test-I**	Two Modules	1½ hrs	5 (set for 30)	20
	Test-II	All Modules	2 hrs	15 (set for 50)	
b)	**Assignment**	-	-	10	30
c)	**Class Activity**			20	
				Total	**50**