

22VLA01 GRAPH THEORY AND OPTIMIZATION TECHNIQUES					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	To introduce graph as mathematical model to solve connectivity related problems.		1.1	The students will be able to apply graph ideas is solving connectivity related problems.	
2.0	To introduce fundamental graph algorithms.		2.1	The students will be able to apply fundamental graph algorithms to solve certain optimization problems.	
3.0	To familiarize the students with the formulation and construction of a mathematical model for a linear programming problem in a real life situation.		3.1	The students will be able to formulate and construct mathematical models for linear programming problems and solve the transportation and assignment problems.	
4.0	To provide knowledge and training using non-linear programming under limited resources for engineering and business problems.		4.1	The students will be able to model various real life situations as optimization problems and effect their solution through Non-linear programming.	
5.0	To understand the applications of simulation modeling in engineering problems.		5.1	The students will be able to apply simulation modeling techniques to problems drawn from industry management and other engineering fields.	

UNIT I - GRAPHS	(9)
Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.	
UNIT II - GRAPH ALGORITHM	(9)
Graph Algorithms – Directed graphs – Some basic algorithms – Shortest path algorithms – Depth – First search on a graph – Theoretic algorithms – Performance of graph theoretic algorithms – Graph theoretic computer languages.	
UNIT III - LINEAR PROGRAMMING	(9)
Formulation – Graphical solution – Simplex method – Two-phase method – Transportation and Assignment Models.	

UNIT IV - NON-LINEAR PROGRAMMING	(9)
Constrained Problems – Equality constraints – Lagrangean Method – Inequality constraints –Karush – Kuhn-Tucker (KKT) conditions – Quadratic Programming.	
UNIT V - SIMULATION MODELLING	(9)
Monte Carlo Simulation - Types of Simulation -Elements of Discrete Event Simulation – Generation of Random Numbers – Applications to Queuing systems	
TOTAL (L:45) :45 PERIODS	

REFERENCES:

- 1.Taha H.A, “Operation Research: An Introduction”, Ninth Edition, Pearson Education, NewDelhi, 2010
- 2.Gupta P. K, and Hira D.S., “Operation Research”, Revise Edition, S. Chand and Company Ltd., 2012.
- 3.Sharma J.K., “Operation Research”, 3rd Edition, Macmillan Publishers India Ltd., 2009.
- 4.Douglas B. West, “Introduction to Graph Theory”, Pearson Education, New Delhi, 2015.
- 5.Balakrishna R., Ranganathan. K., “A text book of Graph Theory”, Springer Science and Business Media, New Delhi, 2012
- 6.Narasimh Deo, “Graph Theory with Applications to Engineering and Computer Science”, Prentice Hall India, 1997.

Mapping of COs with POs / PSOs								
COs	POs						PSOs	
	1	2	3	4	5	6	1	2
1	1	2	3	4	5	6	1	2
2	3	-	1	2	3	-	2	-
3	3	-	1	2	3	-	2	-
4	2	-	2	1	2	-	1	-
5	2	-	2	1	2	-	1	-
CO	3	-	2	1	1	-	1	-

C.N. Mani