Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Semester – III (Second Year)
Subject: MCA-305 – Optimization Technique (OT)

SUB Total CREDIT	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th.	Pr.	Th.	Th.	Th.	Pr.	
3	3	--	25	25	50	0	100

Course Description: Optimization Technique includes various Operations Research techniques used for optimization in business, economy, industry, resource allocation, etc. Optimization technique is the study of scientific quantitative decision making methods used to solve real life optimization problems.

Objectives:

1. The course is intended to provide basic understanding of Operation Research Techniques of strategic decision planning for optimum utilization of constraint resources in various span of human life *viz.* industry, business, commerce, administration, management, service supply, maintenance, agriculture, medicines and healthcare, defense etc.
2. The students will learn purpose, importance and applications of optimization techniques of Operation Research and will be able to design and construct suitable optimization models to solve real life strategic problems – issues.
3. It is expected to emphasis on the algorithmic approach rather than on theoretical side.

Mathematical algorithms and derivations are not included for any topic identified. The students are required to use tools like Matlab, Scileab, MS Excel, Mini Tab to implement and apply various optimization techniques.

Course Contents:

UNIT – I: Basics of Operations Research and Linear Programming [20%]

Basics of Operation Research: Operation Research introduction, definitions, features, advantages and applications

Linear Programming Problem (L.P.P.): Linear Programming Problem (L.P.P.), Mathematical definition of a L.P.P. with its components: objective function and constraints, optimal solution, slack, surplus and artificial variables, Graphic method, Simplex method, Big – M method, Primal & Dual problem definition

UNIT – II: Special Cases of Linear Programming Problem [20%]

Transportation problem (T.P.): Mathematical definition of a T.P., Method to find initial basic feasible solution, North-West corner rule, Least cost cell entry method, Vogel's approximation method, Test of optimality for finding an optimum solution – Modi method,

Variation in transportation problem: Unbalanced Supply and Demand, Degeneracy and its resolution, Alternative Optimal Solution (Exclude: Prohibited transportation routes)

Assignment problem (A.P.): Mathematical definition of an Assignment Problem, Method to find an optimum solution - Hungarian Method, Variations of the Assignment Problem: Multiple optimal solutions, Maximization case, Unbalanced Assignment Problem, Restrictions on Assignments

UNIT – III Theory of Games and Queues [20%]

Theory of Games: Introduction, Two – Person Zero Sum game, Pure strategies (Minimax & Maximin principles) Games with saddle point, Rules to determine saddle point.

Theory of Queues: Introduction, Queuing system and problem, transient and steady states, traffic intensity, probability distributions in queuing systems, single service queuing model.

UNIT – IV: Management of Inventory and Replacement [20%]

Management of Inventory: Introduction and terminology of the inventory management, Single Item Inventory Control Models without Shortages, Model –I : EOQ model with constant rate of demand Model – II : EOQ model with different rate of demand.

Management of Replacement: Definition, replacement of items that deteriorates, replacement of item that fails completely.

UNIT – V: Project Management and Scheduling [20%]

Project Management (CPM & PERT): Network concepts, components, rules for network construction, critical path method (CPM) and Project evaluation and Review Techniques (PERT)

Production scheduling (job sequencing): Introduction, Johnson's algorithm for n jobs 2 machines, Johnson's algorithm for N jobs m machines, 2 jobs m machines using graphical method.

Text Book(s):

1. J. K. Sharma, "Operations Research – Theory and Application", 4th Edition, Macmillan Publishers India Ltd.

Other Reference Books:

1. Kanti Swarup, Gupta P.K. , Man Mohan, "Operations Research", Sultan Chand & Sons, New Delhi
2. Shah, Gor, Soni, "Oper ations Research", PHI
3. V. K. Kapur, "Operations Research – Problems & Solutions", Sultan Chand & Sons, New Delhi

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