RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Mechanical Engineering, VII-Semester

Open Elective ME- 703(A) Operation Research & Supply Chain

Course Objective:
The student will be made .
1.   To be familiar with all the OR Techniques and optimization methods.
2.   To understand the role of logistics in the supply chain within a focal firm as well as between organisations linked within a given supply chain network. and ,
3.   To be familiar with various inventory control techniques.
4.   To clear idea of the decision making and meta-heuristic algorithm.

Course Content:
Unit 1 Linear system and distribution models: Mathematical formulation of linear systems by LP, solution of LP for two variables, Simplex method, special cases of LP- transportation and assignment model and their graphical solution, Vogels Approximation Method (VAM) or penalty method, cell evaluation degeneracy, basics of SW Lindo, Tora, Excell.

Unit II Supply chain (SCM): Definition, importance, expenditure and opportunities in SCM; integrationof inbound, outbound logistics and manufacturing to SCM, flow of material money and information,difficulties in SCM due to local v/s system wide (global) optimization and uncertainties in demand andtransportation; Bull-whip effect; customer value; IT, info-sharing and strategic partnerships; plant andwarehouse-network configuration; supply contracts and revenue sharing; outsourcing; transportation,cross docking and distribution, forecasting models in SCM; coordination and leadership issues; changeof purchasing role and vendor rating, variability from multiple suppliers.

Unit III Inventory models: Necessity of inventory in process and safety stock, problem of excess inventory and cycle time, JIT/ Lean Mfg; basics of inventory models with deterministic demand, Classical EOQ Model, ABC, VED and other analysis based on shelf life, movement, size, MRP technique and calculations, lot sizing in MRP, linking MRP with JIT; evolution of MRP to ERP to SCM and e-business.

Unit IV (a) **Waiting Line Models:** Introduction, Input process, service mechanism, Queue discipline,
single server (M/M/1), average length and average time calculations, optimum service rate; basic multipleserver models (M/M/s)
(b) **Competitive strategy:** concept and terminology, assumptions, pure and mixed strategies, two-person zero sumgames, saddle point, dominance, graphical, algebraic and LP methods for solving game theory
problems.

Unit V: (a) **Network Analysis:** Project Planning, Scheduling and Controlling; Project management; Network Techniques and its role in project management, Network logics, Fulkerson's Law, Merits and Demerits of AON Diagrams; Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Determination of critical path, Float/Slack.
(b) **Meta-heuristics:** Definition of heuristic and meta-heuristic algorithms; introduction to Tabu search,Simulated Annealing and Genetic algorithms and solution of traveling salesman, non linearoptimization problems.

References:
1. Hillier FS and Liberman GJ; Introduction to Operations Research concept and cases; TMH
2. Simchi-Levi, Keminsky; Designing and managing the supply chain; TMH.
3. Heera and Gupta,Operation Research, S Chand Pub.
4. Sharma JK; Operations Research; Macmillan
5. Taha H; Operations research; PHI
6. Jain, pandey & shrivastava; Quantitative techniques for management, New Age publishers.
7. Srinivasan G; Quantitative Models In Operations and SCM; PHI Learning
8. Mohanty RP and deshmukh SG; Supply Chain Management; Wiley India
9. Sen RP; Operations Research-Algorithms and Applications; PHI Learning
10. Bowersox DJ, Closs DJ, Cooper MB; Supply Chain LogistiMgt; TMH
11. Bronson R ;Theory and problems of OR; Schaum Series; TMH
12. Kantiswaroop,Operation Research, Sultan Chand

Course Out Comes:

Evaluation:
Evaluation will be continuous and integral part of the class as well as through external assessment.