# MASTER OF BUSINESS ADMINISTRATION (MBA) SYLLABUS SEMESTER-II

**COURSE CODE – MB203C Course: OPERATIONS RESEARCH**

**Course Objectives:** The objective of the course is to give an overview of different Optimization Techniques useful for problem solving and decision making.

1. To introduce OR techniques such as Linear Programming Problem.
2. To analyse special cases of LPP such as Transportation Problem, Assignment Problem.
3. To Study network Concepts and techniques like PERT and CPM.
4. To study quantitative competitive strategy models such as game theory, simulation and queuing theory.

# Course Outcomes:

1. Helps in formulating real life situations in organizations in Quantitative form.
2. Helps in formulating strategies for optimal use of various resources within the organizations..
3. Application of optimization tools for decision-making.

# Unit – I: Introduction

* 1. Introduction to OR**-** Origin, Nature, definitions, Managerial applications and limitations of OR.
	2. Linear and Non- Linear, Integer, Goal [Multi-Objective] and Dynamic Programming Problems (Emphasis is on Conceptual frame work-no numerical problems.
	3. Linear Programming: Mathematical model, Formulation of LPP, assumptions underlying LPP, Solution by the Graph, Exceptional cases.

# Unit – II: Allocation Model - I

1. LPP - Simplex Method- Solution to LPP problems Maximisation and Minimisation cases Optimality conditions. Degeneracy.
2. Dual - Formulation, Relationship between Primal - Dual, Solution of dual, Economic interpretation of dual.
3. Sensitivity analysis and its implications.

# Unit – III: Allocation Model - II

1. Transportation Problem (TP) - Mathematical model, IBFS using northwest corner rule, Row and Column Minimum methods, Matrix minimum method(LCM) and Vogel's approximation method, Unbalanced TP, Degeneracy, Optimality Test and Managerial applications.
2. Assignment Problem (AP): Mathematical model, Unbalanced AP, Restricted AP, method of obtaining solution- Hungarian method.
3. Travelling salesman problem, Managerial applications of AP and TSP.

# Unit – IV: Network Models

1. Network fundamentals- scheduling the activities -Fulkerson’s Rule –CPM- earliest and latest times -determination of ES and EF in the Forward Pass - LS and LF in backward pass determination of Critical Path, Crashing, time cost trade off.
2. PERT-Beta Distribution, probabilistic models, Calculation of CP, resource analysis and allocation.

# Unit – V: Waiting Line / Competitive Strategy Models

1. Queuing Theory - Concepts of Queue/Waiting Line - General structure of a Queuing system- Operating characteristics of Queues, deterministic Queuing models - Probabilistic Queuing Model –Cost Analysis - Single Channel Queuing model - Poisson arrival and exponential service times with infinite population.
2. Game Theory**-** concepts, saddle point, Dominance, Zero-sum game, two, three and more Persons games, analytical method of solving two person zero sum games, graphical solutions for (m x 2) and (2 x n) games.
3. Simulation**-** Process of simulation, Applications of simulation to different management Problems.

# Suggested Books:

* 1. N.D. Vohra, “Quantitative Techniques in Management”, 2010, 4thEd.TMH.
	2. J.K. Sharma, “Operations Research Theory and Applications 2009, 4th Ed. Macmillan.
	3. Kasana, HS & Kumar, KD, “Introductory Operations Research theory and applications”, 2008, Springer.
	4. Chakravarty, P, “Quantitative Methods for Management and Economics”, 2009, 1st Ed. HPH.
	5. Barry Render, Ralph M. Stair, Jr. and Michael E. Hanna, “Quantitative analysis for Management”, 2007, 9th Ed. Pearson.
	6. Pannerselvam, R, “Operations Research”, 2006, 3rd Ed. PHI.
	7. Selvaraj, R, “Management Science Decision Modeling Approach”, 2010, 1st Ed. Excel.
	8. Ravindren, A, Don T. Phillips and James J. Solberg, 2000, “Operations Research Principles and Practice”, 2nd Ed. John Wiley and Sons.
	9. Hillier, Frederick S. & Lieberman, “Introduction to Operations Research Concepts and Cases”, 2010, 8th Ed. TMH.
	10. Prem Kumar Gupta & others, “Operations Research”, 2010, S. Chand.
	11. K.K Chawla, Vijaygupta, Bhushan K. Sharma, Operations Research, Quantitative Analysis for Management, Kalyani Publications,2020.