MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act,1956

COURSE CONTENT

QUANTITATIVE TECHNIQUES FOR MANAGEMENT								
II SEMESTER								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
22MBA0012	**CORE**	4	-	-	4	40	60	100
Contact Classes:60	**Tutorial Classes:** Nil	**Practical Classes:** Nil				**Total Classes:** 60		
Prerequisite: Basic concepts of quantitative techniques								

COURSE OVERVIEW:

This course introduces the fundamentals of Operations Research, focusing on scientific decision-making, model building, and the role of quantitative and qualitative analysis in managerial problem solving. It covers Linear Programming techniques for optimal resource allocation, including graphical and simplex methods, along with duality and real-world applications. The course also explains Assignment and Transportation models to optimize allocation and distribution problems efficiently. Decision Theory and Network Analysis are included to support decision-making under uncertainty and to plan, schedule, and control projects using PERT and CPM techniques. Finally, it introduces Queuing Theory and Game Theory to analyze waiting line systems and competitive decision situations for better strategic outcomes.

COURSE OBJECTIVES:

- To explain the nature, scope, and significance of Operations Research in decision-making.
- To illustrate the structure and formulation of Linear Programming Problems.
- To demonstrate the methods for solving assignment and transportation problems.
- To explain decision-making processes under risk and uncertainty using network analysis techniques.
- Explain queuing models and game theory concepts in operations management.

COURSE OUTCOMES: After Completion of the course, students should be able to

1. Explain operations research, its scope, applications, problem-solving methods, model types and development process.
2. Describe the structure, assumptions, applications of Linear Programming and Transportation Problems.
3. Use the Hungarian Method and other techniques for settling assignment problems.
4. Evaluate decisions under uncertainty, risk and certainty using decision trees for planning projects efficiently with PERT-CPM methods.
5. Analyze various queuing models and game theory concepts, service structures, queue disciplines for optimizing resource allocation through strategic decision-making.

Unit – I: Introduction to Operations Research: Nature and Scope of Operations Research: Origins of OR, Applications of OR in different Managerial Areas, Problem Solving and Decision-making, Quantitative and Qualitative Analysis. Defining a Model, Types of Models, Process for Developing an Operations Research Model, Practices, Opportunities and Shortcomings of using an OR Model.

Unit – II: Linear Programming Method: Structure of LPP, Assumptions of LPP, Application Areas of LPP, Guidelines for Formulation of LPP, Formulation of LPP for Different Areas**,** Solving of LPP by Graphical Method: Extreme Point Method, Simplex Method, Converting Primal LPP to Dual LPP, Limitations of LPP.

Unit – III: Assignment Model: Algorithm for Solving Assignment Model, Hungarians Method for Solving Assignment Problem, Variations of Assignment Problem: Multiple Optimal Solutions, Maximization Case in Assignment Problem, Unbalanced Assignment Problem, Travelling Salesman Problem, Simplex Method for Solving Assignment Problem.
Transportation Problem: Mathematical Model of Transportation Problem, Methods for Finding Initial Feasible Solution: Northwest Corner Method, Least Cost Method, Vogels Approximation Method, Test of Optimality by Modi Method, Unbalanced Supply and Demand, Degeneracy and its Resolution.

Unit – IV: Decision Theory: Introduction, Ingredients of Decision Problems. Decision-making under Uncertainty, Cost of Uncertainty under Risk, under Perfect Information, Decision Tree, Construction of Decision Tree.
Network Analysis: Network Diagram, PERT, CPM, Critical Path Determination, Project Completion Time, Project Crashing.

Unit – V: Queuing Theory: Queuing Structure and Basic Component of a Queuing Model, Distributions in Queuing Model, Different Queuing Models with FCFS, Queue Discipline, Single and Multiple Service Station with Finite and Infinite Population. Game Theory, Suddle Point, Value of the Game.

TEXT BOOKS:

- Mik Wisniewski, Dr Farhad Shafti, Quantitative Analysis for Decision Makers, Pearson,7e,2019.
- Miguel Ángel Canela, Inés Alegre, Alberto Ibarra, Quantitative Methods for Management: A Practical Approach, Springer International Publishing,1e,2019.
- James E. Sallis, Geir Gripsrud, Ulf Henning Olsson, Ragnhild Silkoset, Research Methods and Data Analysis for Business Decisions: A Primer Using SPSS, Springer International Publising,1e,2021.
- R. Pannerselvam, Operations Research, Prentice Hall International, 3e, 2015.
- N.V.S. Raju, Operations Research: Theory and Practice, CRC Press, 2020.

REFERENCE BOOKS:

1. Quantitative Analysis for Business Decisions – Harold Bierman, Charles P. Bonini & Warren H. Hausman — Publisher: R. D. Irwin.
2. Quantitative Analysis for Business Decisions – K. Shridhara Bhat — Publisher: Himalaya Publishing House.
3. Quantitative Analysis for Business Decision I – B. A. Vasu & D. Manikanthan — Publisher: Vikas Publishing House.
4. Quantitative Analysis for Decision Makers – Mik Wisniewski, Farhad Shafti & Wee Meng Yeo — Publisher: Pearson.

ELECTRONIC RESOURCES:

1. https://unidesktesting.motion.ac.in/uguarantuub/P1R9854/astraeny/P6R3390113/quantitative-analysis-for_business__decisions__notes.pdf
2. https://www.geektonight.com/quantitative-techniques-for-business-decisions-pdf/
3. https://anyflip.com/ynwo/acfr/basic
4. https://freebooksummary.com/quantitative-technique-for-business?utm_source=chatgpt.com
5. https://onlinecourses-archive.nptel.ac.in/noc19_mg15/preview

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. PowerPoint presentation
11. Drishya Siksha Sangrah (DSS) Videos