Dr. V. N. Bedekar Institute of Management, Thane
Teaching Plan (MMS)
Academic Year (2015-2017)

Programme Name: MMS Semester: - **II**

Name of the Course: Operations Research

Maximum marks: 100 **No. of Sessions:** 15

Name of the Faculty: MR. Marathe
Mobile No:

Email:

Weblink: NA

Learning Objectives:

Formulate and solve problems as networks and graphs. develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems. use CPM and PERT techniques, to plan, schedule, and control project activities.

Reference Books:

1. Operation Research - Taha
2. Quantitative Techniques in Management – N.D.Vohra
3. Quantitative Techniques in Management – J.K.Sharma
4. Operations Research, Methods & Problems – Sasieni M. & others
5. Principles of Operations Research – N.M. Wagher
6. Operation Research – V.K.Kapoor
7. C. R. Kothari: Introduction to Operations Research (Vikas)
8. Gupta & Khanna: Quantitative Techniques for decision making(Prentice Hall India)
9. Introduction to Operations Research – Gillett – McGraw Hill Publications
10. Introduction to Management Science – Hillier – McGraw Hill Publications

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Plan:

Session No	Topics to be covered	References-Print/Online	Learning outcomes
1	Introduction to OR : Concepts, Genesis, Application Potential to Diverse Problems in Business & Industry, Scope and Limitations. Assignment Problem (AP)– Concepts, Formulation of Model Hungarian Method of Solution – Maximisation / Minimisation – Balanced / Unbalanced– Prohibited Assignments - Problems	Lecture and case analysis	To Understand concepts, application
2	Transportation Problem (TP) :- Concepts, Formulation of Model - Solution Procedures for IFS and Optimality Check Balanced / Unbalanced Maximization / Minimization Case of Degeneracy Prohibited Routing Problems Post-Optimal Sensitivity Analysis	Lecture	To understand Transportation problem
3	Linear Programming (LP) :- Concepts, Formulation of Models Diverse Problems– Graphical Explanation of Solution - Maximisation / Minimisation – Simplex Algorithm–	Lecture and case analysis	To understand Linear programming

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	□ Use of Slack /Surplus / Artificial Variables – □ Big M Method/Two-Phase Method – □ Interpretation of the Optimal Tableau – □ (Unique Optimum, Multiple Optimum, Unboundedness, Infeasibility & Redundancy Problems.)		
4	□ Linear Programming (LP) :- □ Duality Principle- Primal /Dual Inter-relation □ Post-Optimal Sensitivity Analysis for changes in b-vector, c-vector, Addition/Deletion of Variables/Constraints □ Dual Simplex Method- Problems Limitations of LP vis-a-vis - Non-linear Programming Problems. □ Brief introduction to Non-LP models and associated problems.	Lecture	To understand the Duality Principle
5	□ Network Analysis □ Minimal Spanning Tree Problem - Shortest Route Problem □ Maximal Flow in Capacitated Network - Concepts and Solution Algorithm as Applied to Problem □ Project Planning & Control by use of CPM/PERT Concepts. Definitions of Project □ Jobs, Events- Arrow Diagrams - Time Analysis and Derivation of the Critical Path – □ Concepts of Floats (total, free, interfering, independent) - Crashing of a CPM Network - Probability Assessment in PERT	Lecture and case analysis	To understand Network Analysis

	Network.		
6	□ Queuing (Waiting-line) Models □ Concepts- Types of Queuing Systems (use of 6 Character Code) - Queues in Series and Parallel – □ Problems based on the results of following models (M/M/1) Single Channel Queue with Poisson Arrival Rate, and Negative Exponential Service Time, With and Without Limitations of Queue Size (M/G/1) □ Single Channel with Poisson Arrival Rate, and General Service Time, PK-Formulae.	Lecture	To understand Queuing
7	□ Inventory Models □ Types of Inventory Situations □ Fixed Quantity/Fixed Review Period □ Costs Involved- Deterministic Probability Models - Economic-Order-Quantity (EOQ) and □ EBQ for Finite Production Rate - Sensitivity Analysis of EOQ-EOQ Under Price Break - □ Determination of Safety Stock and Reorder Levels - Static Inventory Model - (Insurance Spares).	Lecture	To understand Inventory Models
8	□ Digital Simulation– □ Concepts- Areas of Application - Random Digits	Lecture	To understand Digital Simulation

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	and Methods of Generating Probability Distributions □ Application to Problems in Queueing, Inventory, New □ Product, Profitability, Maintenance etc.		
9	□ Replacement and Maintenance Models :- □ Replacement of Items Subject to Deterioration and Items Subject Random Total Failure □ Group vs Individual Replacement Policies.	Lecture **1 Session of 3 Hours** ❖ Game Theory - Concepts - 2 – person ➢ N-person games - Zero - sum and Non-zero-sum	To understand Replacement and Maintenance
10	□ Game Theory - Concepts - 2 – person □ N-person games - Zero - sum and Non-zero-sum games Solution Procedures to 2-person zero sum games □ Saddle point Mixed Strategy □ Sub-games Method for m x 2 or 2 x n games - Graphical Methods	Lecture	To understand Game Theory
11	□ Equivalence of Game Theory and Linear Programming Models □ Solution of 3x3 Games by LP Simplex including Duality □ Application for Maximising / Minimising Players' Strategy.	Lecture and case analysis	To understand equivalence of Game Theory

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Evaluation:

I) Internal:

Component	Details	Marks
Class Test	Multiple choice question test	20
Presentation	Group presentation	10
Case Study	Group Discussion	5
Participation		
Others	Attendance	5

II) External:
(Sample questions)

- What is Operation research and its applications?
- What is Operation Research and its features?
- What are the tools of operation research?
- What is model in operation research?

Signature of Faculty **Signature of the Co-ordinator**