CORE PAPER –X -OPERATIONS RESEARCH - I

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem		
V	21CMA5D	Core paper –X	5	75	5	75	0	3

COURSE OBJECTIVES:

The students will be able to

- Develop computational skills and logical thinking in formulating Industry oriented problems as a mathematical problem and finding solutions to these problems.
- Solve the formulation techniques and optimization techniques of socially relevant problems.

COURSE OUTCOMES:

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Understand about operations research and the formation of Linear Programming Problem	K2
CO2	Solve Linear Programming problem using Big – M method and Duality	K3
CO3	Find optimum solutions for transportation problems	K3
CO4	Assign each source to each destination using assignment problems	K3
CO5	Analyze the results for various real life mathematical problems using inventory models	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	M
CO2	M	S	S	M	M	S
CO3	S	S	M	S	M	M
CO4	S	M	S	M	M	S
CO5	S	S	M	M	S	M

S- Strong M – Medium L – Low

UNIT I: LINEAR PROGRAMMING PROBLEM **15 Hours**

Introduction to Operations Research – General Linear Programming Problem – Mathematical formulation of LPP – Graphical solution – Simplex Algorithm – Simple Problems.

(Chapter 1: Sections 1.1 to 1.23

Chapter 2: Sections 2.6 to 2.16)

UNIT II: ARTIFICIAL VARIABLE TECHNIQUE AND DUALITY **15 Hours**

Artificial Variable Technique – Big – M method – Duality – Primal and Dual relation – Simple Problems.

(Chapter 2: Sections 2.17 (2.17-1) and 2.18)

UNIT III: TRANSPORTATION PROBLEM **15 Hours**

Transportation problem – Mathematical formulation – Initial Basic Feasible Solution – The Transportation Algorithm (MODI Method) – Unbalanced transportation problem.

(Chapter 3: Sections 3.1 to 3.7)

UNIT IV: ASSIGNMENT PROBLEM **15 Hours**

Assignment problem – The assignment algorithm (The Hungarian Assignment Method) – Unbalanced Assignmentproblems –Profit Maximization Problems.

(Chapter 4: Sections 4.1 to 4.7)

UNIT V: INVENTORY MODELS **15 Hours**

Inventory models – EOQ model – (a) Uniform demand rate, Infinite production rate with no shortages, (b) Uniform demand rate, Finite production rate with no shortages – Simple Problems.

(Chapter 12: Sections 12.1 to 12.5)

DISTRIBUTION OF MARKS: THEORY 10% AND PROBLEMS 90%

TEACHING METHODOLOGY

1. Class room teaching
2. Giving Assignments for all units
3. Discussions
4. Home test
5. PPT presentation

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Gupta P.K. and Hira D.S.	Problems in Operations Research	Sultan Chand & Sons, New Delhi	2000

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	KantiSwaroop and Gupta P.K. Manmohan	Problems in Operations Research	Sultan Chand & Sons, New Delhi	2002
2.	H. A. Taha	Operations Research	Macmillan Publishing Company, New York	2003
3.	P. R. Vittal	Operations Research	Margham Publications, Chennai	2003
4.	J. K. Sharma	Operations Research : Theory and Applications	Macmillan, Delhi	2001

WEB RESOURCES

1. *https://www.maths.unp.ac.za/coursework/MATH331/2012/linearprogramming.pdf*
2. *https://towardsdatascience.com/operations-research-in-r-transportation-problem-1df59961b2ad*

SYLLABUS DESIGNER

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