Course Code	Course Title	C	H	I	E	T
17U5KMC12	Elements of Operations Research	5	90	25	75	100

Learning Objectives
- To understand the basic concept of Operations Research and tools used in business decisions.
- To gain working knowledge on Linear Programming, Transportation and Assignment problems
- To apply game, queuing and network analysis in business situations

Learning Outcomes: Knowledge on operations research tools and its applicability in business decisions and ability to solve various business problems through OR tools.

Unit I
Introduction to Operations Research and Linear Programming

Definition – Characteristics – Uses of Operations Research – Techniques of Operations Research – Limitations. Linear Programming Problem - Meaning – Advantages – Areas of Application – Formulation of LPP – Graphical Method – Simplex Method (Simple problems only)

Unit II
Assignment Problem

Meaning – Hungarian Method – Types of Problems – Balanced Problem – Unbalanced Problem – Minimization Problem – Maximization Problem –Restricted Assignment Problem – Travelling Salesmen Problem.

Unit III
Transportation Problem

Meaning – Types of Problems – Balanced Problem – Unbalanced Problem – Minimization Problem – Maximization Problem – Initial Basic Feasible Solution - Methods – North-West Corner Method – Least Cost Method – Vogel's Approximation Method – Optimal Solution - Optimality Test under Modified Distribution Method (MODI Method).

Unit IV
Game Theory and Queuing Theory

Game Theory – Meaning – Saddle Point Method – Maximin Minimax Principle – Dominance Principle Method – Algebraic Method – Graphical Method.
Queuing Theory– Application Areas – Advantages – Single Channel Model Only (simple problems only).

Unit – V
Network Analysis

Meaning – Applications – Terminologies – Rules to frame a Network – Network Diagram – Critical Path Method (CPM) – Programme Evaluation and Review Techniques (PERT) (Simple Problems Only).

Note:

The Questions should be asked in the ratio of 80% Problems and 20 % Theory.

Book for Study:

Kapoor V.K. & Sumant Kapoor, *Operation Research Techniques for Management*, Sultan Chand & Sons, New Delhi.

Books for References:

1. K.K. Chawla,
2. Vijay Gupt & Bhushan K. Sharma, *Operations Research Quantitative Analysis for Management*, Kalyani Publishers, New Delhi.
3. Chawla. K.K, Vijay Gupta & Bhushan K. Sharma, *Operation Research Quantitative Analysis for Management*, Kalyani Publishers, New Delhi.
4. K. Shridhara Bhat, *Operation Research,* Himalaya Publishing House, Mumbai.
5. J.K.Sharma, *Quantitative Techniques in Management,* Trinity Press, New Delhi.
6. S. Gurusamy, *Operations Research*, Vijay Nicole Imprints Private Limited, Chennai.
7. www.icmai.in