# OPERATIONS RESEARCH
## (PROFESSIONAL ELECTIVE-II)

**Course Code: 15ME1124**

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**Course outcomes:**

At the end of the Course, the Student will be able to:

**CO 1** solve Linear Programming Problem and simplex method.

**CO 2** estimate optimal solution for transportation and assignment problems

**CO 3** plan sequencing of jobs on different machines and solve game theory problems

**CO 4** Explain the concept of EOQ and differentiate queuing models

**CO 5** identify best replacement period for machines and analyze dynamic programming problems

**UNIT-I** **(10 Lectures)**

**LINEAR PROGRAMMING PROBLEM:**

Introduction, linear programming, mathematical formulation of the problem, graphical solution, general LPP, canonical and standard form of LPP. Simplex method: introduction, computational procedure, use of artificial variables- big M method

**UNIT-II** **(11 Lectures)**

**TRANSPORTATION PROBLEM:**

Introduction, LP formulation of transportation problem, the transportation table, solution of transportation problem, finding IBFS: North-West corner rule, least – cost method and VAM, test for optimality, degeneracy in transportation problem, transportation algorithm

### ASSIGNMENT PROBLEM:

Introduction, Mathematical formulation of the problem, Hungarian assignment method only, special cases in assignment problems, formulation of the travelling salesman problem

## UNIT-III (9 Lectures)

### SEQUENCING PROBLEM:

Introduction, Problem of Sequencing, Processing n jobs through two machines. n jobs through three machines

GAME THEORY: Introduction, Two person zero sum games, maximin - minimax principle, games without saddle points- mixed strategies, graphical solution of 2Xn, mX2 games, and dominance property

## UNIT-IV (10 Lectures)

### INVENTORY CONTROL:

Introduction, types of inventories, costs associated with inventories, the concept of EOQ, deterministic inventory problems with no shortages, with shortages

### QUEUING THEORY:

Introduction, queuing system, elements of queuing system operating characteristics of a queuing system, classification of queuing models:Model-1 (M/M/1:"/FIFO), Model-2 (M/M/1: N/FIFO)

## UNIT-V (10 Lectures)

REPLACEMENT PROBLEM - Replacement of items that deteriorate gradually, replacement of items that fails suddenly

DYNAMIC PROGRAMMING - Recursive equation approach, dynamic programming algorithm, solution of discrete DPP

## TEXT BOOK:

KanthiSwarup, P.K.Gupta and Man Mohan, "Operations Research", Sultan Chand and Sons New Delhi, 14th Edition -2008.

## REFERENCES:

1. Hamdy. A. Taha, "Operations Research an Introduction", Pearson Education, 7th Edition, 2002.
2. S.D Sharma, "Operations Research", Kedar Nath and Ram Nath - Meerut , 2008.