17HS059 Operations Research

Course Description and Objectives:

The course aims at building capabilities in the students for analysing different situations in the industrial/ business scenario involving limited resources and finding the optimal solution within constraints. The objective of this course is to enable the student to understand and analyse managerial and engineering problems to equip him to use the resources such as capitals, materials, productions, controlling, directing, staffing, and machines more effectively.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained.
2	Determine optimal strategy for Minimization of Cost of shipping of products from source to Destination/ Maximization of profits of shipping products using various methods, Finding initial basic feasible and optimal solution of the Transportation problems
3	Optimize the allocation of resources to Demand points in the best possible way using various techniques and minimize the cost or time of completion of number of jobs by number of persons.
4	Model competitive real-world phenomena using concepts from game theory. Analyse pure and mixed strategy games
5	Formulate Network models for service and manufacturing systems, and apply operations research techniques and algorithms to solve these Network problems

Unit-I

Introduction to OR: Meaning and scope of O.R, Definition of O.R, LPP (Linear Programming Problem). Formulation of LPP, graphical solution of LPP- Problems

Unit-II

LPP: Def. of LPP , IBFS, Basic and Non-basic variable, Slack variable, Surplus variable and Artificial variable .Simplex method, Big M, two phase simplex methods and problems

Unit – III

Transportation problem : Its definition, feasible solution by North-West corner rule, matrix minima VAM methods. Optimal solution through MODI **&** stepping stone method for balanced and unbalanced transportation problem.

Unit-IV

Assignment problem: Meaning of assignment problem, unbalanced assignment problem, travelling salesman problem, Hungarian method for optimal solution.

Unit - V
Sequencing problem: Optimal sequencing of N Jobs on 2 and 3 machines without passing.

Text Books:

1. Kanti swaroop, P.K.Guptha and Man Mohan: Operation Research. Sultan Chand.

2. BA/BSc III Year paper - IV Statistics - quality, reliability and operations Research - Telugu   Academy by Dr T.C.Ravichandra Kumar, Dr R.V.S.Prasad, Dr D.Giri, Dr G.S.Devasena.

3. Operation Reach – S.D.Sharma.

Reference books

1. S.K Sinha: Reliability and life testing. Wiley Eastern.
2. Operations researcHh - Models and methods by Chandrasekar Salimath, Bhupendar Parashar.
3. Operation Research – Taha.

17HS059A Operations Research Lab

<u>Conduct any 6 Practical:</u>

1. LPP - Graphic solution.

2. Simplex method.

3. Two phase simplex methods.

4. Transportation - NWCR. Matrix minima method. VAM for IBFS.

5. Assignment Problem (Balanced).

6. Unbalanced assignment problems.

7. Travelling salesman problems.

8. Sequencing problems- n jobs-2 machines sequencing problem.

9. n jobs-3 machine sequencing problem.