

## OPERATIONS RESEARCH

**Credits:4**

**Semester: V**

**Subject Code: BS21048**

**No. of Lecture hours: 60**

**Objective:** To arrive at optimal solutions to complex problems using methods such as Mathematical modelling & algorithms.

**Outcome:** Students will be able to

**CO1:** Identify the various techniques of operations research and to translate a real-world problems, given words, into a mathematical formulation.

**CO2:** Construct the simplex table and to plan the optimum results.

**CO3:** Use the program for optimizing the cost involved in transportation problems

**CO4:** Develop and solve transformation models and assignment models

**CO5:** Design the sequence of jobs and to make up the total process time

### UNIT-I

**12Hrs**

#### Operations research:

- |   |   |
|---|---|
| 1. Meaning and scope of operations research                             | 1 |
| 2. Convex sets and their properties, Definition of general LPP          | 1 |
| 3. Solution of linear programming problem by graphical method           | 1 |
| 4. Statements of fundamental theorem of LPP and other related theorems. | 2 |
| 5. Formulation of Linear Programming Problem                            | 3 |
| 6. Optimum solution of linear programming problem by simplex Method.    | 4 |

### UNIT-II

**12Hrs**

#### Concept of artificial variables.

- |   |   |
|---|---|
| 1. Big M/Penalty method and two-phase simplex methods.                    | 6 |
| 2. Concepts of duality of LPP.  | 1 |
| 3. Dual primal relationship, statement of fundamental theorem of duality. | 5 |

### UNIT-III

**12Hrs**

- |  |   |
|--|---|
| 1. Definition of transportation problem  | 1 |
| 2. TPP as a special case of LPP,   | 1 |
| 3. Initial basic feasible solution by North West corner rule, Matrix Minima and VAM Methods. | 3 |

4. Optimal Solution through MODI and stepping stone method for balanced and unbalanced transportation problem.	4
--	---

5. Degeneracy in Transportation problem and resolving it.	
2	

6. Concept of transshipment problem.	
1	

<b>UNIT-IV</b>	<b>12hrs</b>
----------------	--------------

1. Formulation and description of Assignment problem and its variations.	1
--	---

2. Assignment problem as a special case of T.P and L.P.P	1
--	---

3. Unbalanced Assignment problem,	
1	

4. Optimal solution using Hungarian Method	
6	

And travelling salesman problem and its solution.	
3	

<b>UNIT V</b>	<b>12hrs</b>
---------------	--------------

1. Problem of Sequencing	2
--------------------------	---

2. Optimal sequence of N jobs on two machines	5
---	---

and three machines without passing under appropriate conditions.	5
--	---