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| <b>Subject Code: 2CM1010212</b> | <b>Subject Title: Operation Research</b><br><b>Course Type: Core Elective: Statistic</b> |
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**Course Objective:** To provide basic information to students about the Operation Research and its development in the field of commerce.

| Teaching Scheme (Hours per week) |          |           |        | Evaluation Scheme (Marks) |                          |       |
|----------------------------------|----------|-----------|--------|---------------------------|--------------------------|-------|
| Lecture                          | Tutorial | Practical | Credit | University Assessment     | Institutional Assessment | Total |
| 4                                | -        | -         | 4      | 70                        | 30                       | 100   |

| Subject Contents |                                                                                                                                                                                                                                                                                                    |             |            |
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| Sr. No           | Topic                                                                                                                                                                                                                                                                                              | Total Hours | Weight (%) |
| 1                | <b>Linear Programming – I:</b><br>Introduction of Operation Research, Meaning and Uses of linear programming, Mathematical formulation of LP Problem for two variables, Important Terms used in Linear Programming, solution of LP problems by Graphical Method.                                   | 9           | 25%        |
| 2                | <b>Linear Programming-II:</b><br>Introduction of Simplex method, Slack variable, Surplus variable, Incoming variable, Pivot column, Pivot row, outgoing variable, solution of LP problems by Simplex Method.                                                                                       | 9           | 25%        |
| 3                | <b>Transportation Problems:</b><br>Formulation of transportation problem its initial basic feasible solution by North-West Corner rule, Matrix minima (least cost method), Vogel's Approximation Method (VAM) and optimum solution by modified distribution method, degeneracy and its resolution. | 9           | 25%        |
| 4                | <b>Assignment Problems: -</b><br>Meaning, Assignment problem with Restriction, Unbalanced Assignment Problem, Maximization Problems and its optimum solution by Hungarian method.                                                                                                                  | 9           | 25%        |

**Reference Books:**

1. H. A. Taha : Introduction to Operations Research, PHI Publications, New Delhi
2. Hillier & Lieberman: Introduction to Operations Research, Tata McGraw Hill Publication, New Delhi.
3. P. K. Gupta and Manmohan: Operation research and statistical analysis, S. Chand. Co, New Delhi
4. S. D. Sharma: Operation Research, Kedar Nath & Co., Meerut