

# GUJARAT TECHNOLOGICAL UNIVERSITY

## M.E. (CIVIL) – (Branch-49)-Construction Management Year – I (Semester – II) (W.E.F. January 2013)

### 1724905: Major Elective – II      Operational Research

| Sr. No. | Course Content  |
|---------|---|
| 1       | <b>Introduction</b><br>Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem ,Formulation of LPP, Graphical solution of LPP. Simplex Method, Artificial variables, big-M method, two-phase method, degeneracy and unbound solutions.   |
| 2       | <b>Transportation Problem</b><br>Transportation Problem. Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions,“ Northwest corner rule, least cost method and Vogel’s approximation method. Optimality test: the stepping stone method and MODI method.  |
| 3       | <b>Assignment and Sequencing</b><br>Assignment model. Formulation. Hungarian method for optimal solution. Solving unbalanced problem.   |
| 4       | <b>Dynamic Programming and Game Theory</b><br>Dynamic programming. Characteristics of dynamic programming. Dynamic programming approach for Priority ,Management employment smoothening, capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems<br>Games Theory. Competitive games, rectangular game, saddle point, minimax (maxi min) method of optimal strategies,<br>Replacement and Inventory Models<br>Replacement of Items that deteriorate whose maintenance costs increase with time without change in the money value. Replacement of items that fail suddenly: individual replacement policy, group replacement policy<br>Inventory models. Inventory costs. Models with deterministic demand |

#### Tutorials:-

1. Assignment work is based on above subject contents.

#### Reference:

- 1 Operations Research, P. Sankara Iyer, Tata McGraw-Hill
2. Operations Research, A.M. Natarajan, P. Balasubramani, A. Tamilarasi, , Pearson Education
3. Operations Research Theory & Applications , J K Sharma., Macmillan India Ltd,
4. Operational Research ,Kalavathy S., Vikas Publishing
5. Quantitative Techniques in Management ,Vohra, N.D. , Tata McGraw Hill Co., Ltd ,