GUJARAT TECHNOLOGICAL UNIVERSITY
M.E. Semester: III
Construction Engineering & Management

Subject Name **OPERATIONS RESEARCH IN CONSTRUCTION**
(Major Electives – 4)

Sr.No	Course content
1.	Introduction to Operation Research history, nature, scope and phases of Operation Research, Classification of Operation Research models.
2.	**Decision Theory** Decision strategies – decision under certainty – decision under risk – decision under uncertainty – formulation – decision criterion and decision under competitive situation.
3	**Game Theory** Classification of games. Two – person, zero – sum games – formulation of pay off matrix – saddle points – games with pure strategies and mixed strategies – value of the game. Solution to 2 x 2 matrix, 2 x n matrix, m x 2 matrix and m x n pay-off matrix. Graphical method, algebraic method, linear programming methods. Guidelines to modelling an OR project.
4	**Linear Programming** General and standard forms of LPP Formulation and solution methods – graphical solution – simplex method – dual simplex method, dynamic L.P. Transport and assignment models. Post – optimality analysis. Complications in LP problems and resolution. Queuing theory and waiting time – application to industries. Introduction to dynamic programming and network analysis. Monte – Carlo system simulations.
5	**Case Studies** Developing mathematical models related to construction projects. Solution to problems using QSB computer package.

Tutorials on OPERATION RESEARCH IN CONSTRUCTION MANAGEMENT

1. Decision theory
2. Game theory
3. Formulation of LPP
4. Solution of LPP by graphical method, simplex method, big M method, 2nd phase method.
5. Sensitivity analysis.
6. Transportation problems.
7. Assignment problems.
8. Non linear & dynamic programming problems.
9. Waiting line theory
10. Use of QSB computer package.

Reference Books:

1. Theory & Problem of Operations Research by   Richard   Bronson,   Schaum's Outline Series - Mc Graw Hill Book Co., 1983
2. Operations Research : An Introduction by Hamdy A. Taha - Maxwell Macmillan International Edition – IV Edition – 1989
3. Operations Research for Management by G.V. Shenoy, U.K. Srivastav, S.C. Sharma - Wiley Eastern Limited – 1988
4. Operations Research for Management by M.P. Gupta, J.K. Sharma - National Publishing House – 2nd Edition – 1987
5. Operations Management by John O. Mcclain and Joseph Thomas - Prentice Hall of India Private Limited, New Delhi – 1987
6. Quantitative Methods and Operations Research by R.C. Gupta - CBS Management Series – 1986
7. Quantitative Techniques in Management by Vohra -   Tata McGraw Hill Book Co.
8. Rea's Problem Solver – Operation Research - Research & Education Association Publication