



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721414

Operation research in Construction Management

2nd SEMESTER

Type of Course: Elective

Prerequisite: NIL

Rationale:

The course is design to provide fundamental knowledge of Operation Research in Construction Projects.

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE	PA(M)	Viva	PA (I)		
3	0	2	4	70	30	30	20	150

Course Contents

Sr.No.	Topics	Hrs.
1	Introduction Introduction to Operation Research history, nature, scope and phases of Operation Research, Classification of Operation Research models.	03
2	Decision Theory Decision strategies - decision under certainty - decision under risk - decision under uncertainty - formulation - decision criterion and decision under competitive situation.	10
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 modeling an OR project.	10
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.	10
5	Case Studies Developing mathematical models related to construction projects, Solution to problems using QSB computer package.	06
Total		39



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Reference Book(s)

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

Course Outcome

Sr. No.	CO statement	Marks % weightage
CO-1	Students would able to apply decision theory to construction project problems	33%
CO-2	Students would able to apply game theory and queuing theory to construction project situations	33%
CO-3	Students would able to apply linear programming and simulation concepts for operational issues of construction projects	34%

List of Tutorials:

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. Nonlinear & dynamic programming problems.
9. Waiting line theory
10. Use of QSB computer package

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	25	20	20	15	10



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Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C:
Create and above

List of Open Source Software/learning website: www.nptel.ac.in/courses/