SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2021-2022

MASTER OF SCIENCE IN QUALITY AND PRODUCTIVITY MANAGEMENT
M. Sc. Applied Statistics, Semester – I

Course Code	PS01CQPM55	Title of the Course	OPERATIONS RESEARCH – I
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To impart knowledge in concepts and tools of Operations Research. 2. To understand the fundamental mathematical models used in Operations Research. 3. To apply these techniques constructively to make effective business decisions.

Course Content

Unit	Description	Weightage (in %)
I	Overview of the Optimization Techniques, History of Operations Research (OR), Definitions of OR, Scientific Method in OR, Methodology of OR, Applications and Scope of OR. Introduction to Linear Programming Problems(LPP), General Structure of LPP, Assumptions of LPP, Advantages and Limitations of LPP, Application of LPP.	25
II	Mathematical formulation of the problem, Terminologies used in LPP, Graphical Method for solving LPP, cases of degeneracy, infeasible and unbounded solutions, merits and demerits of the method.	25
III	Simplex Method: Introduction, Algorithm, cases of degeneracy, infeasible and unbounded solutions, Two-Phase Method-Algorithm, cases of degeneracy, infeasible and unbounded solutions.	25
IV	Big-M method: Algorithm, cases of infeasible and unbounded solutions, Concept of Duality, Dual Simplex method-Algorithm, cases of degeneracy, infeasible and unbounded solutions, Integer Linear Programming- Gomory Cut method-Algorithm, cases of degeneracy, infeasible and unbounded solutions.	25

Teaching-Learning Methodology	Interactive Class Lectures

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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	formulate linear programming problems and solve Linear Programming Problems using appropriate techniques and optimization solvers.
2.	conduct and interpret post-optimal and sensitivity analysis and explain the primal-dual relationship.
3.	dealing with irregularities like degeneracy, infeasible and unbounded solutions.

Suggested References:	
Sr. No.	References
1.	Kambo, N. S. (1991) . *Mathematical Programming Techniques.* Affiliated East-West Press Pvt. Ltd.
2.	Hadley, G. (1987). *Linear Programming*. Narosa Publications.
3.	Taha, H. A. (1992). *Operations Research 5th ed*. Macmillan.
4.	Jhamb, L. C. (2009). *Quantitative techniques for managerial decisions, Vol-I& II, 16th ed*. Everest Publishing House.
5.	Kanti Swarup, Gupta P. K. and Man Mohan Singh (1977). *Operations Research*, Sultan Chand & Sons.

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6.	N. D. Vohra (2011) *Quantitative Techniques in Management, 4th ed*. Mc Graw Hill.
7.	V. K. Kapoor(1998) *Problems & Solutions in Operations Research, 2nd ed*. Sultan Chand & Sons.
8.	R. Sivarethinamohan (2008) *Operations Research, 1st ed*. Mc-Graw Hill.
9.	J. K. Sharma(2009) *Quantitative Techniques For Managerial Decisions, 1st ed.* Macmillan.

On-line resources to be used if available as reference material
On-line Resources

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