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

(Mater of Science in Statistics) (Master of Science)
(M. Sc.) (Statistics) Semester (II)

Course Code	PS02ESTA52	Title of the Course	OPERATIONS RESEARCH
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. Familiarize with linear and non-linear programming problems and their applications in real life problems. 2. To know various methods for problem solving with constraints. 3. To know Network analysis and Queuing theory.

Course Content		
Unit	Description	Weightage* (%)
1.	Linear Programming: Convex sets, supporting and separating hyperplanes, standard linear programming problem, basic feasible solutions, simplex algorithm and simplex method, geometry of simplex method. Duality in linear programming, duality theorems.	25
2.	Dual simplex method with justification, post optimality analysis, sensitivity analysis and parametric linear programming. Integer Linear Programming: Introduction, Gomory Cut Method, Branch and Bound Method.	25
3.	Network Analysis: Definition and formulation, critical path method, Project Evaluation and Review Technique (PERT), Optimal allocation of resources (menpower) through time schedule.	25
4.	Queueing Theory: Introduction, steady state solution of M/M/c/∞/FIFO and M/M/C/N/FIFO with associated distributions of queue length and waiting time.(c=1 as particular case). Non-linear Programming: Quadratic Programming, Kuhn-Tucker Conditions	25
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Teaching-Learning Methodology	On-line/off-line 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.	Enhance capability to understand and address real life problem in society.
2.	Plan, execute and review community project in context of cost factor.
3.	Formulate linear/non-linear programming problem.
4.	Network problem involving certainty or uncertainty.

Suggested References:	
Sr. No.	References
1.	Hadley, G. (1961). Linear Programming, Addison-Wesley.
2.	Taha, H. A. (1997). Operations Research(6th Edition, Prentice-Hall India Ltd
3	Searl, S. R. (1982). Matrix Algebra Useful for Statictics, John Wiley.
4	Rao, A. R. and Bhimasankaran, P. (1992). Linear Algebra, Tata McGraw Hill, New Delhi.

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

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