

Course Code	MB18207	Course Name	QUANTITATIVE TECHNIQUES	Course Category		Foundation Course	L	T	P	C
							2	0	2	3

Pre-requisite Courses		Co-requisite Courses		Progressive Courses	
Course Offering Department		Data Book / Codes/Standards			

Course Learning Rationale (CLR):	<i>The purpose of learning this course is to:</i>	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Formulating some real life linear programming problems and identifying the characteristics of LPP.	1	2	3	1	2	3	4	5	6	7
CLR-2 :	A basic understanding of the quantitative techniques to analyze and examine the results with the proposed recommendations for decision making in order to incorporate in the organizations.										
CLR-3 :	This course is designed to include the fundamentals of operation research for reporting and exploring mathematical software to solve the proposed models.										
CLR-4 :	This course is designed to prepare students to handle responsible roles in business analytics to apply mathematical tools to solve the optimization problems.										
CLR-5 :	To get the conceptual idea for majorly used quantitative techniques needed in any business environment.										
Course Learning Outcomes (CLO):	<i>At the end of this course, learners will be able to:</i>	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Business Environment & Domain Knowledge (BEDK)	Critical Thinking, Business Analysis, Problem Solving and Innovative Solutions (CBPI)	Global Exposure and Cross-cultural understanding (GECCU)	Effective Communication (EC)	Leadership and Team Work (LT)	PSO - 1	PSO - 2
CLO-1 :	Perform various optimization techniques to operations problem, explain how it works and perform the necessary calculations.	1	60	50	H	M	M	H	L		
CLO-2 :	Map out and determine whether a process is appropriate to the needs of the organization and recommend steps or policies for implementation and improvement.	1	50	70	L	H	H	L	M		
CLO-3 :	Assess the strategic role of operations for competitive advantage and the measures by which performance is gauged.	2	80	75	L	H	H	M	M		
CLO-4 :	Assist in implementing a customer oriented approach to running the firm by setting appropriate strategic decisions for operations.	2	80	70	L	H	H	M	M		
CLO-5 :	To fulfill the needs of an organization utilizing all the quantitative techniques mentioned.	3	90	80	M	H	H	M	M		

Duration (hour)		9	9	9	9	9
S-1	SLO-1	Introduction to Linear programming problem	Introduction to Transportation Problems	Introduction to Network Models	Introduction to Queuing Theory, Classification of queuing models	Introduction to Game theory

	SLO-2	Formulation of linear programming problem			Essential features of queuing system	
S-2	SLO-1	Introduction to Graphical solution method of LPP.	Initial basic Feasible Solution of transportation Problems using N-W corner, Least cost Method & VAM method.	Shortest Path Problem	Problem solving on Model (M/M/1)(∞ /FCFS)	Solution of Two person zero-sum Games with pure strategy, minimax-maximin principle
	SLO-2	Problem solving on graphical methods	Problem Solving	Problem Solving		
S-3	SLO-1	Simplex Algorithm	Optimality Test: MODI method	Maximum Flow Problem	Problem solving on Model (M/M/1)(∞ /FCFS) continued...	Mixed strategy games: Algebraic Method, Dominance Rule
	SLO-2	Problem solving using simplex method (Maximization/Minimization case)	Problem Solving	Minimum Spanning Tree		
S-4	SLO-1	Discussion on some special cases in simplex method	Special cases of Transportation problem: Unbalanced, Maximization & Degeneracy	Introduction to Sequencing	Introduction to Replacement Problem	Problem solving using Dominance rules
	SLO-2	Problem solving	Problem Solving	Sequencing Model: M Job 2 Machines		
S-5	SLO-1	Introduction to the concept of Duality	Assignment algorithm (Hungarian Method)	Sequencing Model: M Job 3 Machines Problems	Replacement Policy when the Value of Money Remains constant with Time	Graphical Method to solve $2X_n, mX_2$ games
	SLO-2	Constructing Dual problem from primal and its solution	Problem Solving	Problem Solving	Problem Solving	
S-6	SLO-1	Mathematical Formulation of Integer programming (IP)	Special cases of Assignment problem: Unbalanced, Maximization & Multiple optimal solutions	Decision Theory: Decision Making Under Certainty	Replacement Policy when the Value of Money Changes with Time	Introduction to Monte Carlo Simulation
	SLO-2	Problem solving	Problem Solving		Problem Solving	
S-7	SLO-1	Gomory's Cutting Plane Method	Trans-shipment problem	Decision Making Under Uncertainty	Replacement of Equipment that Fails Suddenly: Individual Replacement policy, Group Replacement policy	Monte Carlo Simulation applications in Inventory Management
	SLO-2	Problem solving	Problem Solving		Problem Solving	Problem Solving
S-8	SLO-1	Introduction to Dynamic Programming Algorithm	Travelling salesman Problem	Case studies	Group Replacement policy	Simulation Applications in Queuing
	SLO-2	Shortest Route Problem	Problem Solving		Problem Solving	Problem Solving
S-9	SLO-1	Summary and revision	Summary and revision	Summary and revision	Summary and revision	Summary and revision
	SLO-2					

Learning Resources	This course is offered with the purpose of teaching the various concepts of Quantitative Techniques & Operations Research in such a way that students can relate the techniques and its concepts into real market and business activities with the help of and Lectures-Seminars, case constructions, Presentation & discussions.
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		Learning Assessment											
	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)										Final Examination (50% weightage)	
		CLA -1 (5marks)		CLA -2 (5marks)		CLA-3 (10marks)		CLA -4 (15marks)		CLA -5(15marks)		Marks -100 which will be weighted at 50%	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice			Theory	Practice
Level 1	Remember												
	Understand												
Level 2	Apply												
	Analyze												
Level 3	Evaluate												
	Create												
	Total	100 %		100 %		100 %		100 %		100%		100 %	

CLA – 1-5: can be from any combination of these: Class Participation, Surprise Test, Cycle test, Model Examination, Mini-Projects etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
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