Course Code	UMS20402T	Course Name	RESOURCE MANAGEMENT TECHNIQUES	Course Category	C	Professional Core Course	L	T	P	C
							4	0	0	4

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics and Statistics		Data Book / Codes/Standards	Graph sheet needed	

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1 :	To provide foundations in Operations Research
CLR-2 :	To apply basic concepts of Linear programming problems
CLR-3 :	To learn and understand Operations research approach to various applications
CLR-4 :	To provide a set of algorithms for solving sequencing problems
CLR-5 :	To employ appropriate methods of Game theory
CLR-6 :	To have a proper understanding of decision making problems

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	To recognize the scope and models of Operations research methods for decision making process.	3	85	80	L	L	L	M	L	-	-	-	L	M	H	M	-	-	-
CLO-2 :	To apply Operations research techniques for solving real life problems	3	80	75	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLO-3 :	To know optimization through various transportation and assignment problems	3	85	80	H	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-4 :	To schedule jobs through machines using the prescribed algorithm	3	85	80	M	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-5 :	To calculate saddle point, strategy and value of the game by various methods	3	85	80	H	H	M	H	H	-	-	-	M	M	H	M	-	-	-
CLO-6 :	To deal with optimization problems in real life situation	3	75	80	H	H	M	H	M	-	-	-	M	M	H	M	-	-	-

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to Operations Research(O.R)	Introduction to Linear Programming Problem (LPP)	Transportation Problems(TP) - Examples, Definitions – decision variables, supply and demand constraints	Sequencing Problems: Introduction	Game theory: Definitions, Examples
	SLO-2	Scope of O.R	Mathematical formulation of LPP	Mathematical formulation of TP	Assumptions made while solving Sequencing problem	Characteristics of Game theory
S-2	SLO-1	Some O.R. Models	Basic assumptions to formulate LPP	Balanced and Unbalanced TP	Total elapsed time, Idle time, No passing Rule	Pure Strategies: Maximin -Minimax Principle
	SLO-2	Iconic Models, Analogue Models	Procédure for forming a LPP model	Methods for finding Initial basic feasible solution	Procedure for sequencing n jobs on 2 machines	Saddle point and value of the game
S-3	SLO-	Mathematical Models	Formulation of LPP Model	North West Corner Rule	Sequencing n jobs on 2 machines	Mixed Strategies: Games without

	1					saddle points
	SLO-2	Static Models ,Dynamic Models	Formulation of LPP Model	North West Corner Rule	Sequencing n jobs on 2 machines	Solving 2x2 games
S 4	SLO-1	Deterministic Models, Stochastic Models	Graphic method of solving LPP	Row Minima Method	Sequencing n jobs on 2 machines	Solving 2x2 games
	SLO-2	Classification of Models	Graphic method Special Cases: Infeasibility	Column Minima Method	Procedure for sequencing n jobs on 3 machines	Matrix oddment method for 3x3 games
S-5	SLO-1	Characteristics of O.R.	Graphic method Special Cases: Unboundedness	Least Cost Method	Sequencing n jobs on 3 machines	Matrix oddment method for nxn games
	SLO-2	Principles of Modelling	Graphic method Special Cases: Redundancy	Least Cost Method	Sequencing n jobs on 3 machines	Matrix oddment method for nxn games
S-6	SLO-1	General methods for solving O.R. Models	Graphic method Special Cases	Vogel's Approximation Method(VAM)	Procedure for sequencing n jobs on m machines	Dominance property
	SLO-2	Main phases of O.R: Formulation of the problems:	Graphic method Special Cases	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
S-7	SLO-1	Main phases of O.R: Formulation of the problems:	Graphic method Special Cases	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
	SLO-2	Construction of a mathematical model	Advantages of LPP	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
S-8	SLO-1	Construction of a mathematical model	Advantages of LPP	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
	SLO-2	Solving the model constructed	Limitations of LPP	Unbalanced Transportation Problem	Sequencing n jobs on m machines: computational details	Dominance property: Computational details
S 9	SLO-1	Controlling and updating	General Linear Programming Problem	Unbalanced Transportation Problem	Sequencing n jobs on m machines: computational details	Graphical method for 2x3 games
	SLO-2	Testing the model and its solution, Implementation	Types of Solutions	Maximization case in Transportation Problem	Processing of 2 jobs on n machines	Graphical method for 2xn games
S 10	SLO-1	Role of O.R in industry	Canonical form of LPP	Assignment Problem(AP): Examples, Definitions – decision variables, supply and demand constraints	Processing of 2 jobs on n machines: Computational details	Graphical method for 2xn games
	SLO-2	Role of O.R. in Various fields	Standard form of LPP	Mathematical formulation of AP, Balanced and Unbalanced AP	Processing of 2 jobs on n machines: Computational details	Graphical method for 3x2 games
S-11	SLO-1	O.R and decision making	Simplex Algorithm Introduction	Assignment Algorithm: Hungarian Method	Processing of 2 jobs on n machines: Computational details	Graphical method for mx2 games
	SLO-2	Role of computers in O.R.	Simplex method: non-degenerate basic solution, degenerate basic solution	Hungarian Method: Computation details	Processing of 2 jobs on n machines: Computational details	Graphical method for mx2 games
S-12	SLO-1	Role of computers in O.R.	Simplex method: basic feasible solution	Solving Unbalanced AP	Processing of 2 jobs on n machines: Computational details	Graphical method for 2xn and mx2 games

	SLO-2	Limitations of O.R.	Simplex Algorithm: Computational details	Maximization case in AP	Graphical method	Limitations of game theory

Learning Resources	Theory: 1. Resource Management Techniques by Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K. Ganesan. 2. Operations Research: An Introduction.H.A. Taha 3. Linear Programming. K.G. Murthy 4. Operations Research. KantiSwarup, Gupta, P.K. and Manmohan

Learning Assessment

Level	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	
Experts from Academic	**Internal Experts**
Dr.M.A.Baskar, Professor & Head, Dept. Of Mathematics, Loyola college, Chennai	J.Madhumitha, SRMIST
Dr.P.Dhanavanthan, Professor & Head, Dept. Of statistics, Pondicherry University	