

Branch Name:	IMCA
Program Code:	CS201
Course Name:	OPERATIONS RESEARCH
Course Code:	1CS3010305T
Pre-requisite Course:	Basic Knowledge of Mathematics

Course Objective:

The objectives of the course are to:

- This course is intended to provide basic understanding of Operation Research Techniques of strategic decision planning for optimum utilization of constraint resources in various spans of human life viz. industry, business, commerce, administration, management, service supply, maintenance, agriculture, medicines and healthcare, defense etc.
- The students will learn purpose, importance and applications of optimization techniques of Operation Research and will be able to design and construct suitable optimization models to solve real life strategic problems – issues.
- It is expected to emphasis on the algorithmic approach rather than on theoretical side. Mathematical derivations are not included for any topic identified.

Teaching Scheme(Hours per week)				Evaluation Scheme(Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	1	-	4	60	40	-	-	100

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Basics of Operations Research Introduction, definitions, features and applications Linear Programming Problem (L.P.P.) Introduction, Structure of Linear Programming Model, General mathematical model of L.P.P., Guidelines on linear programming model formulation, Examples of LP model formulation (Production examples), Extreme point graphical method of LP problem, Simplex method, Big-M method.	10	20
2	Transportation problem (T.P.) General Mathematical model of T.P., Method to find initial basic feasible solution - North-West corner method (NWCM), Least cost method (LCM), Vogel's approximation Method (VAM), Test of optimality for finding an optimum solution – MODI method. Assignment problem (A.P.) Mathematical model of Assignment Problem, Method to find an optimum solution - Hungarian Method.	10	20
3	Queuing Theory Introduction, Structure Queuing System, transient and steady states, Single service queuing model – model-I	8	20

4	<p>Management of Inventory Introduction and terminology of the inventory management, Single Item Inventory Control Models without Shortages, Model –I : EOQ model with constant rate of demand</p> <p>Management of Replacement Definition, Types of Failure, Replacement policy for items whose running cost increases with time & value of money remain constant during a period, Replacement of items that completely fail.</p>	10	20
5	<p>Project Management(CPM&PERT) PERT/CPM Network components and precedence relationships, Critical Path Analysis, Project scheduling with uncertain activity times, Difference between PERT & CPM</p> <p>Sequencing Problems Introduction, Processing job through two machines, Processing job through three Machines Processing n jobs through m machines</p>	10	20

Course Outcome:

At the end of this course, the student would be able

- To get knowledge of different optimization techniques
- To formulate the different linear programming problems.
- To solve the problem of linear programming problem.
- To solve the problem of the game & queuing theory.
- To solve the problem of inventory management
- To solve the problem of Project management & sequencing
- To solve the problem of replacing theory.

List of References:

1. J.K.Sharma, "Operations Research – Theory and Application", 4th Edition, Macmillan Publishers India Ltd.
2. Kanti Swarup, Gupta P.K., Man Mohan, "Operations Research", Sultan Chand & Sons, New Delhi
3. Shah, Gor, Soni, "Operations Research", PHI
4. V.K.Kapur, "Operations Research – Problems & Solutions", Sultan Chand & Sons, New Delhi

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To Apply operations research techniques like L.P.P, scheduling and sequencing in industrial optimization problems.	2 Understanding 3 Applying
CLO2	Make use of LPP techniques for optimization of Production mix problem in industry.	1 Remembering 2 Understanding 3 Applying
CLO3	Evaluate transportation, transshipment, assignment and travelling salesman and Queuing problem.	1 Remembering 4 Analyzing
CLO4	Apply quantitative techniques in machine replacement, game theory, business decision making under conditions of certainty, risk and uncertainty.	2 Understanding 3 Applying 5 Evaluating
CLO5	Demonstrate Project management Problem.	1 Remembering 2 Understanding 4 Analyzing
CLO6	To Gain knowledge on current topics and advanced techniques of operations research for industrial solutions	3 Applying 4 Analyzing 6 Creating

Mapping of CLOs with Pos & PSOs

Course Learning Outcomes	Program Out comes (POs)												Program Specific Outcomes (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1		M	L	M		M	H	L	M		M		H	M
CLO2	M	L			H	L		L		M	L	L	M	M
CLO3		L	M		M	M		L	M	M		L	M	L
CLO4	L		M	L	M		M		L		L		M	M
CLO5	M	L		M	L			M		L		L	M	L
CLO6	M		M		L	M			M	M		L	L	M

H: High, M: Medium, L: Low