OPERATIONS RESEARCH

Course code	20ME2701A	Year	IV	Semester	I
Course category	Open Elective	Branch	Common to all	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	-
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Understand the basics of linear programming, transportation, queueing , sequencing of jobs, replacement, inventory and simulation problems	**L2**
CO2	Apply linear programming, transportation and assignment models to solve real life problems	**L3**
CO3	Apply Sequencing, queueing, Game and Replacement theories to solve problems	**L3**
CO4	Apply knowledge of inventory control and simulation to solve practical industrial problems	**L3**

Contribution of Course Outcomes towards achievement of Program Outcomes& Strength of correlations

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	√	√								√	√		√	√
CO2	√	√								√	√		√	√
CO3	√	√								√	√		√	√
CO4	√	√								√	√		√	√

Syllabus		
UNIT No.	**Contents**	**Mapped CO**
I	**Introduction to Operations Research:** History, definition, operations research models, phases of implementing operations research in practice, applications. **Linear Programming**: Introduction, formulation, graphical solution, simplex method, artificial variable techniques – Big M and two-phase methods, duality principle.	**CO1 CO2**
II	**Transportation**: Formulation, initial feasible solution, optimal solution – MODI method, unbalanced transportation problems, degeneracy in transportation problems. **Assignment**: Formulation, optimal solution, Hungarian method, travelling salesman problem.	**CO1 CO2**
III	**Queuing theory**: Introduction, Kendall's notation, classification of	**CO1**

	queuing models, single server and multi-server models, Poisson arrival, exponential service, infinite population **Sequencing**: Introduction, assumptions, processing n-jobs through two machines, n-jobs through three machines, and graphic solution for processing 2 jobs through n machines with different order of sequence.	**CO3**
IV	**Game Theory**: Introduction, game with pure strategies, game with mixed strategies, dominance principle, graphical method for 2xn and mx2 games. **Replacement Theory**: Introduction, replacement of items that deteriorate with time - value of money unchanging and changing, simple probabilistic model for replacement of items that fail completely	**CO1** **CO3**
V	**Inventory control**: Introduction, inventory costs, Economic Order Quantity (EOQ)Demand rate Uniform and replenishment rate infinite, demand rate non-uniform replenishment rate infinite, Demand rate uniform, models with and without shortages, inventory model with single price break. **Simulation**: Definition, Types of simulation models, phases of simulation, applications of simulation	**CO1** **CO4**

Learning Resource
Text books:
1. Operations Research, by S.D.Sharma, Kedarnath & Ramnath publications (15th edition),2013. 2. Introduction to Operations Research, by Taha, Pearson Education,New Delhi, (8th edition), 2008
Reference books
1. Operations Research, (4th edition) by A.M .Natarajan, P. Balasubramani, ATamilarasi, Pearson Education, New Delhi, 2009. 2. Operations Research, (2nd edition) by R.Pannerselvam, 2009,PHI Publications, Noida 3. Operations Research, (2nd edition) by Wagner, 2007, PHI Publications, Noida 4. Operation Research, (4th edition) by J.K.Sharma, 2009, MacMilan publishers, india Ltd. New Delhi.
E-Resources & other digital Material:
1. http://nptel.ac.in/courses/112106134/ 2. http://nptel.ac.in/courses/112106131/